UNIV. OF
TORONTO
LIBRARY

Digitized by the Internet Archive
in 2010 with funding from
University of Toronto

http://www.archive.org/details/electricalnewsen29donm

BINDING LIST NOV 1 1921

168544
12/1/22

Technol
E
108544
12/1/22

Electrical News
Generation, Transmission and Application of Electricity

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, General Manager.
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700
MONTREAL - Telephone Main 2299 - 119 Board of Trade
WINNIPEG - Tel. Garry 856 - Electric Railway Chambers
VANCOUVER - Tel. Seymour 2013 - Winch Building
NEW YORK - - - Tel. Worth 248 - - - 309 Broadway
CHICAGO - Tel. Harrison 5351 - 1413 Gt. Northern Bldg.
LONDON, ENG. - - - - - - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 **Toronto, January 1, 1920** **No 1**

Employees and Customers Subscribe Eagerly for Local Company's Stock

During the month of November the Commonwealth Edison Company of Chicago, with a view to increasing the number of local shareholders in the company, offered a block of 5,000 shares of stock to its customers and employees. The stock was offered at $112.50, on instalment terms, the initial payment being $5.00 and subsequent payments $5.00 monthly per share, thus distributing the total payment over a period of nearly two years.

Though the original offer was for only 5,000 shares, this amount was later extended on account of the demand that developed. Sales teams were organized among the employees of the company, ten men to a team, under the leadership of captains, and a team assigned to each of the 35 wards of the city. A commission of $1.00 per share was offered to the salesmen for selling the stock, this work being done outside of business hours. A keen rivalry developed between the different teams, which was enhanced by the offer of cash prizes varying from $75 down.

The sales of the 385 salesmen totalled 8,747 shares. These were sold to 3714 persons, a maximum of five shares to a person being fixed. The winning team sold 697 shares and the highest individual sale was 186 shares. The campaign was limited to a 3-day period. It has now been announced that the Public Service Company of Northern Illinois will offer a block of stock to its customers and employees on a similar basis.

The question naturally arises again why Canadian municipalities and companies do not offer their securities in this way. There could be little doubt that our large utilities, whether municipally owned or otherwise would have little difficulty in disposing of their securities locally with the big advantage that their shareholders would automatically become boosters for the utility. Incidentally, this would be a more economical means of placing securities. For example, bonds issued by any Hydro municipality could doubtless be sold over the counter like any other article of merchandise. An experiment along this line—at least an experiment to Canada—would be followed with interest.

Will Power Shortage Delay Ontario's Industrial Development?

"The capacity of the generating plants at Niagara Falls, available to the Commission for supplying the power and lighting demands in the Niagara district, has reached its limit, which has necessitated the Commission limiting the amounts of power that can be supplied to the municipalities in the Niagara district.

"The power shortage during the winter months is greatly increased by the overlapping of lighting and power loads, by the extensive use of electric heaters, and also at times on account of the blocking by ice of the water supply to the generating plants.

"The Commission are asking the co-operation of every Hydro user, whether domestic or industrial, to assist them in conserving power and light in every possible way in order that an uninterrupted service may be maintained, until a further supply of power is obtained for this system."

The above notice has been issued by the Hydro-electric Power Commission of Ontario. It is a serious situation and the end is difficult to see. True, the Commission have 100,000 h.p. on the way as soon as the Chippawa Canal scheme is ready, but that may not be for two or three years. Does this mean that electrical development in that part of Ontario served by Niagara Falls is to be at a standstill for the next two years? If so, it is truly a serious situation for everybody and more especially for manufacturers and dealers in electrical appliances and general supplies. Ontario, industrially, must mark time for two or three years. Is there no way out of this?

It will be remembered that some time ago the Toronto Power Company was developing more than the 125,000 h.p. peak allowed by their charter and an injunction was issued at that time restraining them. The question naturally arises—is the Toronto Power Company still operating under capacity? If so, why cannot this extra capacity be made available to the industries and homes of Ontario? There may be difficulties in the way of course, but it's purely a business matter. Is not the need of the Province sufficiently urgent to justify overcoming whatever obstacles may arise?

The arguments in favor of steam reserves are also greatly strengthened by present conditions. Of course the coal situation is bad, but such a plant would be required for a comparatively short time—two or three hours a day, may be, for two or three months in the year. What a godsend thirty or forty thousand horsepower in steam capacity would have been in the present emergency. Even a twenty-thousand standby like the Toronto Electric Light Co. have would be a great help. It is said this is standing idle. Why is it not being used to supply the needs of the province's industries? Here again there may be obstacles, but surely again it is merely a matter of business arrangement.

Summed up, the situation seems to be that the Hydro municipalities of the province are short some forty or fifty thousand horsepower, while at the same time there is available at least thirty thousand horsepower—perhaps forty—lying idle within a stone's throw. Is it good business or is there any sufficient reason why such remedy as we have should not be taken advantage of?

TK
E44
v.29

New Zealand Favors Trade Within the Empire

The "Electrical Review" of London prints an item under the heading "Bravo Dunedin" as follows:

"We are indebted to a New Zealand correspondent for a copy of a local newspaper dated July 30th, reporting the proceedings at the Dunedin City Council when it was resolved to give preference to a British tender for electrical plant over an American tender which was £800 less. The Council, says the report, decided to accept the tender of the British Westinghouse Co. for a synchronous motor for Half-Way Bush, although the American General Electric Co.'s tender was £3,258, as against the British firm's £4,070, and the latter required a longer term for delivery.

"Councillor Shacklock, in introducing the matter, said that at the last meeting of the Council the matter of accepting a tender for the motor had been held over for further information by cablegram. This had been received and the engineer recommended that the tender of the British Westinghouse Co. be accepted. The purpose of recommending this tender was to obtain a motor of English manufacture. An American machine could be obtained for £800 less and delivery got in five months, whereas the British machine could not be delivered for nine months. The delay might involve some restriction on the users of electric power. He would move that the tender of the British Westinghouse Co. be accepted, provided delivery be given in nine months.

"Councillor Sincock asked would the Westinghouse machine be a more durable machine and what loss was involved to the small users (at present restricted) in the fact that the machine would not get here for nine months. Unless there was some defect in the American machine, he felt inclined to adhere to their original idea of getting the American machine, which could be secured quicker.

"Councillor Clark said he was surprised to hear Councillor Sincock. He hoped the Council would not go beyond the Empire because a little inconvenience or money was involved

"Councillor Shacklock, in reply, said the British Westinghouse machine was quite satisfactory. The department would do its best to meet the demands of the consumers without restrictions, and if such were necessary it would be only in the depth of the winter. The tender was accepted."

The "Electrical Review" of Chicago over the signature of C. A. Tupper, International Trade Press, Inc., Chicago, comments on this item as follows:

"This item of news reflects very clearly the prevailing tendency of Great Britain, her dominions and her colonies to do their trading within the Empire itself. American manufacturers can most profitably concentrate on other countries —particularly non-European—for export business. For the present, however, domestic trade should be our chief, although by no means our only, concern."

Montreal Tramways Bill in Quebec Legislature

The Montreal Tramways Company have introduced a bill into the Quebec Legislature asking to be relieved of the payment of half the cost of sewers along the strips of land on which their lines run in newly annexed territories of the City of Montreal. These sewers, it is claimed, are of no value to the company.

The City of Montreal, in their bill introduced into the Quebec Legislature, ask for powers to control the erection of poles, etc., in the city streets. The main object is to prevent the duplication of poles and wires. The City at present has the right to grant permission to erect poles, etc., but in the event of refusal an appeal is made to the Public Utilities Commission. By the bill power is sought by the city to the effect that no poles, cables, or wires shall be installed or underground conduits constructed without its consent, and that the city shall have the right to refuse any such demand to erect a pole when it may procure by sale or lease the necessary space on the pole line of another company. The rental or price is to be fixed by the city. The city will have the right to determine where the poles and wires now to be erected, the height of the poles, and the spacing of the wires or cables. Questions relating to the expense of any necessary changes and installations and the removal of poles are to be decided by the city. Any indemnity by a company to the owner of a lane is to be fixed by the Electric Service Commission, to which the powers sought by the proposed bill are to be delegated. An appeal may be made to the Public Utilities Commission, from any decision rendered by the Electric Service Commission, fixing rentals, the price of sale, the cost of installation, or maintenance. The members of this commission are to be paid for their service by an annual sum fixed by the Public Utilities Commission, the companies to reimburse the city any sums so disbursed.

Winter Convention of Hydro Engineers January 15-17

The Municipal Electrical Engineers Association hold their semi-annual convention in Toronto on January 15, 16 and 17; Thursday, Friday and Saturday. The first day of the convention will be taken up, for the most part, with business matters, election of officers., etc., and the members will meet for dinner at the Walker House in the evening. On that occasion Major Pope, secretary of the Ontario Commission will address the delegates.

On Friday morning Mr. Jackson, Hydro superintendent at Chatham, will read a paper on "Grounding," and in the afternoon Mr. Buchanan, of London, a paper entitled "Electrical Merchandising, from the view point of a Municipal Hydro department." It is understood that Mr. Buchanan's paper will, in a sense, be a criticism of the Goodwin plan, illustrating weak points of the Goodwin scheme. This paper will be followed by a discussion in which Mr. Goodwin, himself will take the leading part. A most interesting session is looked for on this occasion for it is hoped that much benefit will be derived from this friendly discussion. On Friday evening the members will attend the big electrical banquet being held at the King Edward Hotel, at which, it is hoped, some 400 electrical men will be present.

Saturday is being left open so that the delegates may visit points of interest as they may desire.

Electric Club Activities

The Electric Club of Toronto had an interesting address on December 5 by Mr. T. W. Gordon, of the Engineering Department of the General Electric Company on the subject "Thrust Bearings." On December 12 the speaker was Dr. M. W. Wallace, Professor of English in the University of Toronto, on "Stabilizing Influences in a Democracy," and on December 19 Mr. J. S. McLean, Harris Abattoir Company, outlined the development and scope of the Canadian packing industry. The attendance has been uniformly good, indicating that the members are fully alive to the educative influences of these half-hours spent with some of the brightest minds in other industrial lines.

The first meeting of the New Year will be held on Friday, January 9th, when Rev. Dr. Pidgeon will be the guest of the Club. On January 16th the speaker will be Mr. W. L. Goodwin.

Electricity Again Ousts Steam—Lighter Equipped with Electric Winches

Pennsylvania Railroad Lighter No. 151 enjoys the distinction of being the first vessel of her type to be equipped with electrically-operated winches exclusively. She is used for carrying express shipments around New York Harbour; and as this service is one in which time is an important factor, her winches were arranged for electric drive, instead of the usual steam engines, because it was believed that the use of electricity would materially reduce the time required for handling cargoes. She has now been in commission about two years, and experience goes to show that this idea was correct; for, although it is difficult to carry out an accurate efficiency test in the handling of miscellaneous packages, it is generally conceded by those who are familiar with her work, that No. 151 can take care of 300 tons while the average steam-operated lighter is disposing of 200 tons. The lighter has two systems of booms, one forward consisting of a single main boom with a maximum capacity of 10 tons, and one aft, of the mast and yard type with a maximum capacity of 2 tons. Most steam lighters of the capacity of No. 151 have only one boom system; but with electrical operation, two can readily be employed because the motor-driven winches are so compact that they can be housed in a very small compartment. This compartment is situated in the hull just forward of the pilot house; all the lines run down in front of the pilot house to their respective winches in most direct manner possible. There are eight motors altogether, their purpose and size being shown in the following table.

Service		H.P.
For Forward Boom	(Main Hoist	24
	(Main Boom	24
	(Starboard Guy	15
	(Port Guy	15
For Aft Booms	(Starboard Hoist	15
	(Starboard Guy	15
	(Port Hoist	15
	(Port Guy	15

These motors are of the Westinghouse direct-current crane-type, totally enclosed and equipped with magnetic brakes. Each motor is geared directly to its winch and the winches are arranged in two rows, one above the other.

Industrial Lighting Prospectus—Figures Based on Extensive Survey

The Society for Electrical Development has issued a 16-page multigraphed prospectus containing facts and figures based upon the results of a survey covering 446 industrial consumers in 57 towns in 15 states, in which a large percentage of the industrial activity of the country is concentrated. These facts and figures are intended for the use of salesmen in convincing factory executives or superintendents that their plants are in need of better illumination. With the curtailment of the hours of production every manufacturer in the country is interested in speeding up his plant, increasing production, decreasing spoilage and reducing the number of accidents. Proper illumination will accomplish these results at a minimum expense. Now, therefore, is the logical time to start a campaign for better industrial lighting. The prospectus also contains suggested letters to send to prospective customers and some newspaper advertising suggestions. It is sold for fifty cents and is to be followed in the near future by an Industrial Lighting Handbook. The idea of issuing this prospectus is to get something into the hands of lighting salesmen immediately so that everyone may get started now while the time is ripe.

Montreal Citizens Lacking in Civic Spirit?

Although there is no country in the world where the municipalities have so wide a scope as in Canada. Montreal is singularly lacking in civic spirit, said Mr. F. Wright, editor of the Canadian Municipal Journal, speaking at the Montreal Electrical Luncheon on December 10.

Too many forget their share of the burden of the community's undertakings, and some are citizens only on polling day, forgetting their interest in civic affairs the other 364 days of the year. Nevertheless, everyone criticizes, though he knows next to nothing about municipal management. Take twenty able business men said Mr. Wright, and ask them a few questions on the fundamentals of citizenship and eighteen out of the twenty will be unable to give an answer.

He claimed it is the duty of the people to preserve unimpaired the right to govern themselves and to realize that upon them rested the prosperity, strength and character of young Canada and its future greatness. Government by commission is anti-democratic, and can be abolished only by education. The government of a city cannot be any better than its citizens, and on a higher level than their ideals. While Canadians fought democracy abroad, they are forgetting it at home. Those who had died or suffered wounds gave pledges and made vows for Canadians at home and for generations to follow; they had not sung their love of Canada like birds; they had acted it like men. It is for those who are here to match their ardor and valor in their continuous fight for the national heritages and traditions.

A. I. E. E. Hears Paper on Water Powers

The Toronto branch of the American Institute of Electrical Engineers held their last meeting of the year on Friday evening, December 19, in the Engineers' Club rooms. A good attendance greeted Mr. N. Harvie, chief draftsman in the Hydraulic Department of the Hydro-electric Power Commission of Ontario, who read an interesting paper entitled "Water Powers of Canada." The paper was illustrated by lantern slides and was a complete review of the occurrence and distribution of Canada's twenty-odd million horsepower of waterfall potentialities.

Mr. P. W. Ellis, Chairman of the Toronto Hydro Electric Power Commission and of the Niagara Falls Park Commission, was present and took part in the discussion giving some interesting facts relative to the developments in the Niagara district. He also mentioned the extensive plans of the Commission for making this district into a national playground.

London and Port Stanley Report

The Hydro Electric Power Commission of Ontario have issued a report covering the operation of the London and Port Stanley Railway System for the years ending June 30, 1916-17-18-19. This system is operated under a board known as the London Railway Commissioners, consisting of the following: C. R. Somerville, Mayor of London; Philip Pocock, vice-chairman; William Spittal, honorary-secretary; Charles M. R. Graham; M. D. Fraser, K.C.; Hugh A. Stevenson, M.D. M.L.A.; R. W. Shaw, M.D.; W. A. Martin. Sir Adam Beck is chairman of the board. The report is well illustrated. It shows the cost of electrification and equipment up to the end of June, 1919, as $1,234,866. During the last year the gross earnings were $499,656 and the gross expenses $350,740, leaving an income of $148,915. After deductions for taxes, interest and rental, there is a net income for the year of $50,207, which, after the further deduction of a sinking fund of $19,154, leaves a net surplus of $31,953. The total surplus from the four years' operation is $99,613.

Experiences in Industrial Democracy

Description of Successful Application of an Interesting Internal Government Arrangement in a Large Manufacturing Plant (Concluded)

By F. L. Fluerbach*

At the outset the representative system did not work smoothly. A few of the elected representatives did not attend meetings—some because they did not grasp the idea, others because they were afraid they might be called on to speak, and thus expose their curious English. But other members did catch the theory of representative government from the start. Some of course, at first believed that the whole idea was a fake, but they were willing to be convinced; and once they had the conviction of our sincerity, they went to any length to make the experiment a success. They knew and were in touch with the mass, and they learned and appreciated the mass psychology thoroughly in a very short time.

It is true that their initial interest was purely financial. These people had no practical conceptions of democracy, and democracy in business was something entirely unknown and foreign to them—almost as much as it was to ourselves. Representative government meant nothing to them at the start. They had heard vaguely of various assemblies, but they never had discovered that the form of government made much difference to the individual. They simply came to work to make a living and to get as much money out of their job as could possibly be extracted. A mighty few of them, like most laboring men, realized their responsibility in returning as much as possible for the money which they took out of the business. Each man worked for himself, showing very little concern about his neighbor in his own or the next department.

Co-operation to them seemed entirely superfluous and had to be taught in a practical manner, as preaching with the labor class usually does not go very far. They have heard too much of that in the past and received too many promises which were subsequently not kept, and a lack of response and confidence in preaching or ethical lessons is not their fault so much as the fault of those who are responsible for their disappointment.

The practical way we found to be our dividend system, and this is how it taught co-operation:

A Practical Demonstration

A number of men desired to celebrate an Italian holiday, and stayed away from work. At the next meeting of the House of Representatives it was announced that the dividend for the past two-week period would be only 12 per cent. but that it would have been higher had not the men taken the holiday. That is, a man who earned $20 per week, or $40 for the two-week period, received a dividend of $4.80 instead of $6, thereby losing $1.20 because some other fellows did not work. It is one thing to stay away from work knowing that possibly the company and only yourself will lose money by your act, but it is quite a different proposition to realize that you are guilty of a loss of money to your fellow-workers. Dividends are due to mass action and co-operation is a mass force. The mass can bring in and create co-operation as quickly as it can cause disorder.

Our plan for paying dividends on top of wages as an incentive for better work and a pride in the man's or woman's job, and in the product which he or she manufacture is as follows:

At the expiration of a two-week period the efficiency of the entire shop is determined by the relative value of its output to its cost of production. Standards of production and cost have been established in each department and the savings occasioned by increased production and quality of work, as well as decreased cost and overhead are shared on the 50-50 basis with our employees.

Our first dividend amounted to 6½ per cent. of the salary of each employee and has gone as high as 17½ per cent. These dividends are paid bi-weekly in a separate envelope marked "employees' dividends," and represent their share of profits derived by interest and better work—a bonus upon service.

To stimulate their efforts for higher dividends by the element of competition, we have arranged to award a prize—a large American flag—to that department which shows the greatest saving for the two week period, in other words, the leader in the struggle for higher dividends; and they certainly fight hard for the privilege of displaying the Stars and Stripes in their departments for two weeks. The department which succeeds in securing the banner three times during a certain period is honored in some special manner. The last reward was a dinner given to all workers in the prize-winning department.

You are Stealing My Dividends

I recall going through the plant one day during the first month we had our dividend system and noticed, on entering the sandpaper shop, that one of the boys tried to attract the attention of his fellow worker who, however, would not be disturbed. Jack insistently called to Jim until the latter finally turned around quite indignantly and said: "Now, here, Jack, cut it out: you are stealing my dividends." This and many similar instances showed very plainly that the dividend envelope was quite an incentive to them and that in return meant a good deal to us as far as quality and workmanship were concerned.

After the dividend was established for about three or four months, the House of Representatives came to a conclusion that some of the folks did not do as much to earn these dividends as others. For instance, some would stay out on Mondays and take it easy, have a good time while those in the shop were working hard and earning dividends for them. They subsequently suggested in their House of Representatives that a committee be appointed to work out rules for penalty of tardy, careless, and disinterested fellow workers. The committee brought in the following recommendations which were unanimously accepted and approved by both Senate and Cabinet and have been in force ever since.

If any employee comes late or stays away without a proper excuse for one day during the two-week period he loses one-fourth of his dividends. If this happens twice he loses one-half, three times three-fourths, and if it occurs four times during the same period he loses all his dividends.

This plan, remember, was a suggestion from the men themselves and not a penalty imposed by the employers.

Standardizing Holidays

In connection with this the question came up as to what should be considered legal holidays. Having a number of different nationalities it was quite natural that at one time a number of Polish people would stay away to celebrate one of their own holidays, and next week Italians would do the same thing. One of the representatives said at the House meeting: "This will never do. Every time a group of people stay away down go our dividends because it interferes with production and the idle machinery and waste of power increase our overhead." He then proposed a list of strictly American holidays, which again found wholehearted approval of the other two governing bodies, so that any one celebrating any other holiday except those officially adopted would lose dividends.

---

*Factory Manager, Wm. Demuth & Co., Richmond Hill, N.Y., before recent congress of the National Safety Council.

The folks realized in investigating ways and means to increase dividends that a great handicap was due to the fact that some of them did not understand English well enough, and the Ways and Means Committee suggested in the House that we introduce a rule that we do not employ any people who cannot speak English. Now, we had a good many men in the place who had been there a number of years, who couldn't speak English, so the only thing for us to do was to follow their suggestion and introduce English classes. The Board of Education established two classes for non-English speaking people, and out of every department quite a few of them flocked to the school.

There again we applied our 50-50 principle, as time spent in these classes is one-half in company time. In other words, school lasts one hour, from 4.30 to 5.30 p.m. We pay those who attend up to five o'clock, our regular closing time. In compliance with a recent request from the scholars the time has been extended to 1½ hours under the same arrangements, paying them for 4.15 to 5 p.m., or one-half of the time spent at school, the other half is their own contribution.

One of the important accomplishments which was a direct result of industrial Democracy was the change of working hours. We had been working fifty-three hours per week for a number of years, when in November, 1917, the question arose in the House of Representatives whether same could not be reduced to fifty hours. After a long and careful discussion at a joint session of House and Senate, followed by a mass meeting—usually held about once in six to eight weeks—at which the idea was fully explained to all employees, it was mutually agreed that we should try the fifty hour service for three months. Everyone pledged himself to a full honest 50 hours' service, promising to avoid tardiness and idle machinery; furthermore, that if the earning or production should be decreased, or if for any reason the change did not work satisfactorily, it was understood that everybody would be perfectly willing to return to the 53 hour schedule. Before the trial period was over the production was increased by about 8 per cent., which meant better income and saving for all concerned.

Further Reduction of Hours

Encouraged by this success and the evident happiness of everybody around us, the Cabinet, in October 1918, suggested to both Senate and House to consider the advisability of changing to a 48 hour per week schedule. Some of our employees were somewhat reluctant as they doubted their ability to produce as much work in 48 hours as they had formerly done in 53 hours. To show our appreciation of their willingness to put forth their best efforts in making the change, we adjusted all rates, guaranteeing them from the start the same income as they had before. Consequently results showed no falling off in our production and when a few weeks ago the 44 hour question came up for consideration there was little hesitancy on anybody's part to try out this new change. At this time I am not in a position to give definite figures as to the production. However, several of our departments have made very satisfactory individual records so far.

We have had a Mutual Benefit Association since 1902, which provides for free doctor service, a weekly sick benefit of $6, and death benefit of $100 at an expense to the members of 10 cents per week. As this field was quite well covered, the Senate turned its attention to life insurance, and within a short time after a thorough investigation by Committees of Cabinet, Senate, and House of Representatives, a plan for insurance was evolved and installed in December, 1917, whereby in case of death the beneficiary receives an amount equal to one year's wages, the maximum amount being $3,000. The premiums for same are paid by the employees themselves by one of the percentages of the bi-weekly dividends. In other words if the dividends are found to be 15 per cent. for a certain two-week period, 14 per cent. is paid in cash and 1 per cent. is retained for the insurance. As we have had sixteen deaths since inaugurating insurance, the few who did not believe in the wisdom of insurance at the beginning have been thoroughly and permanently convinced. By the people's vote every employee is thus covered by insurance.

Labor Turnover

One of the important and most constructive functions of both Senate and House is the consideration of the labor turnover. For each meeting—the Senate convenes every Wednesday at 1.30 p.m., the House at 3.30 p.m.—a complete record of employees having left our service is given on a large blackboard, stating name, department, how long in our employ, and reason for leaving or discharge. The foreman of the respective department usually volunteers or is asked for detailed information in any doubtful case.

The men and girls, realizing that losing experienced help—and replacing same by green hands at an average expense of about $100 in some places—means a reduction of dividends for all, do their level best to keep them at work. Many a disheartened boy or girl was induced by his or her fellow-workers to stick to the job and try it out a little longer, by offering to show them a more advantageous way of handling their work.

During the war, when we all experienced a shortage of labor, a few appeals to the mass to bring along friends to fill vacant positions in order to avoid increase in overhead and decrease in production—and consequent decrease of dividends—were quite sufficient to fill our depleted ranks, so that when most of our neighbors were constantly short of help, we actually had a waiting list of applicants.

Since the installation of this system of shop government, each employee realizes that instead of his being a mere cog in a wheel, to be used or dispensed with at some person's convenience, he has become a useful and intelligent unit of the organization with a voice in its management, something to say about how long and under what conditions his best work can be done, and how much he shall receive for it. This has the effect of increasing his self-respect and respect for his job, together with a sense of his personal obligation to his fellow workers. It is giving him an insight into the problems that harass his employers and it creates respect for them and makes him willingly share their burdens. Above all, it awakens the sense of civic responsibility, inspires him to study our language and our customs, and in that way strikes a blow at what is perhaps the most insidious evil at the root of our republican form of government—the ignorance and indifference of the individual of and to the things that are of vital importance.

The reason for the successful operation of the industrial scheme, I believe, is due to the fact that the people are being educated to be self-reliant. With welfare work, etc., they think and feel that you are trying to do something for them, and it is looked upon by them as being too paternal.

Induction Motors—Their Design and Care

Take Sixty-Five Per Cent of all Power Used—Interesting Address Before the Montreal Electric Luncheon

By Mr. N. C. Mills*

There have been sold in Canada about 50,000 induction motors averaging 30 h.p. each or a total, at least, of 1,500,000 h.p. According to the 1918 report of the Commission of Conservation there are 565 generating plants in Canada with a capacity of 2,200,000 h.p. The induction motor uses 65% of all the electric power and without it many a large power plant would be non-existant. It is therefore well to consider the induction motor as the most important piece of electrical apparatus in use.

In the U. S. there was sold in one year nearly 2,000,000 motors. This includes fractional horse power motors but again shows the uses of this piece of apparatus. The present value of the Canadian induction motors is at least $60,000,000 which I suppose is 40% of the cost of the generating apparatus in the country.

Let us consider the motor from the point of view of the user and power company. What are the essentials that should be embodied in a motor to give the best results to the whole community? The first consideration is that the motor should run with as little trouble as possible mechanically. The second that its electrical characteristics should be satisfactory.

One large company with over 25,000 motors in Canada has handled 400 complaints in 5 years, or less than 0.35% of their motors have been reported per year as giving some trouble and only one tenth of these complaints were serious. They repair 200 motors per year or in 125 years they might have to repair all of them. It appears as though a motor might be expected to last 25 years without being repaired. Do you wonder that repair shops have a hard time to live? Motors have not been in use in any number that long but as most of the troubles occur in the first year or so it appears as though 20 years might be a conservative estimate and a considerable number have been in use that long. The older ones were built very liberally and we are constantly equipping them with new windings or reconnecting them and in many cases nearly doubling their output with improved characteristics; you cannot do this with a modern motor.

Air Gap Too Small

Ninety per cent. of troubles arise from the air gap or clearance between rotor and stator becoming too small from worn bearings and the like. If you watch and care for these two points there will never be much trouble with the motor. The actual clearances should not be less than .015 in. in small motors up to .250 in. or more on large ones. The higher the peripheral speed of the rotor the larger should be the air gap. One thousandth of an inch per inch of diameter is about right except on very special apparatus. On some large slow speed motors this amount cannot be used as the non-productive or magnetizing current will be so high as to give too low a power factor. A 4,000 h.p. 60 cycle motor at 83 r.p.m. has been built and operated with .160 in. air gap and a diameter of 256 inches or 21 feet; it should have .250 in. at least. This would give 65% power-factor instead of 81 and the generator would have to be 35% or more oversize based on a 100% power-factor basis. A 25 cycle motor of same speed and capacity would have a .250 in. air gap and a power-factor of 88% or thereabouts. This is about the only superiority of 25 cycles over 60.

The 256 inch diameter with .160 in. gap is of very strong construction but is not one that I would like to have in a plant for which I was responsible. On the other hand a 2-pole, 3,600 r.p.m., 4,000 h.p. motor would have a .250 in. gap, 40 in. diameter and a power-factor of 95.

Power-factor is of more importance than efficiency. Efficiencies of 90% are attainable and easy, but a power-factor of 75 to 80 is common in many isolated plants due to the use of slow speed or underloaded motors. Your generators and other apparatus have to be built on a power-factor rather than on an efficiency basis; heating is what limits the electrical capacity.

Theoretically you might have a generator plant of 100,000 kw. with a power-factor of 10 and an output of 10,000 kw. which would bankrupt someone and has put some power companies in the hole. Heating of generating apparatus is almost entirely due to current and the lower the p.f. the higher the current. A current of 50% p.f. will cause four times the heating for the same power of 100% p.f.

Magnetizing or Light Currents Chief Cause of Low Power Factor

The principal cause of low power-factor is magnetizing or light currents and these depend entirely on air gaps as far as motors are concerned. Large air gaps are necessary for mechanical reasons and small ones for electrical. You can have large gaps and high power-factor by making motors large in diameter and small in length; but this is costly; the cost of a motor varies as the square of the diameter. Underloaded motors will cause poor power-factor. The average motor has a power-factor of 86 at full load and 73 at half load and some slow speed motors have so low a half load power-factor that the generators would have to be as large to carry the half load as the full load on account of the greater d.c. exciting current required by the generator for the large lagging currents.

As many plants have less than 80% p.f. it seems as though the motors are not closely selected for the load that they are to carry. It is probable that an increase of the average power-factor to 95 would add 20% to the present generator capacity and there would be no real cost to the community although someone would have to pay the initial cost of the added apparatus. A zero power-factor at the motor would consume real power in the lines due to resistance and other effects.

Careful Determination of Power-Factor Requirements will Result in Saving

By carefully determining power-factor requirements you will not only decrease the initial cost of your equipment but at the same time your operating costs and no matter who pays for the initial cost it will be a saving in the end. I have in mind a large paper mill, one of the largest in the world; it had plenty of water for 10,000 kw. but it could only generate 8,000 kw. because the power-factor was 75, which called for all the current that a dinky built cheap switchboard would stand. The initial saving in this switchboard was eaten up every hour or so in decreased production. By speeding up the wheels a little and improving the power-factor thereby and keeping the speed steady, considerably greater tonnage of paper was made. In one instance where a generator was shut down and used as a synchronous condenser, the p.f. was increased to 100 and a greater load carried with less water than before.

---

*Montreal Armature Works Limited.

Take two motors consuming 1,000 amps. energy current, one of 75 p.f. the other of 100. The resulting p.f. will not be 87.5 but will be 92 or more and hence considerably more power can be drawn from the generator than is at first apparent. A phase advancer can be used with large wound rotor motors to greater advantage than installing synchronous motors. A phase advancer will cost less than one-third the cost of the other and give much better results.

Heating of Motors

As to heating of motors, any motor that has a temperature of 85°C., or 185°F., must have its load reduced as it will probably have 100°C. or more inside the windings, and this is about the charring point of untreated magnet wire covering used around each turn of the coil. Motors can be built to stand 200°C., but they are not in common use and should not be. Any good induction motor will carry its full load with a temperature of less than 60°C. in a room of 25°C. air. No matter what the room temperature is the actual temperature is what burns out a motor.

Tests of 125 different ratings showed an average temperature rise of 28°C., with only two motors going over 35° and one over 40°. It is now proposed to use motors on a fifty-degree rise basis. This means that if your room is over 25°C., you must reduce the load on the motor. Some motors are made 55°C. rise by merely changing the name plates of the old motors and rating them up 25%. They used to kick if you carried 25% overload continuously, but now by a miracle it seems to be alright.

A large flour mill bought some motors that rose forty degrees in 25° air. They then put them in a room at 40° air, and during the war they wanted to carry 25% overload to increase their production. They could not carry full load without destroying the coils. Where would they have been with 50° motors You get them cheaper but have to put men and instruments to watch them. Where is the economy?

Bearings

Bearings are the next important thing after air gap. A good old fashioned tin babbitt bearing has proven itself the best to use for most induction motors. Ball bearings are used to some extent, but a sleeve bearing is better, and will do all any ball-bearing will do and more. You can rebabbitt it and use it over and over again. If sleeve bearings were installed and used as ball bearings are, there would be no questions as to sleeve bearings' superiority on motors. On automobiles a ball-bearing axle may turn 150 times a minute, and on a motor may turn 1,800 times or ten times as fast, and when you consider that a motor runs day and night in many cases there is no comparison between the two types. There are some motors in Montreal running 1,200,000 miles in a year, 135 miles per hour.

The friction on a good sleeve bearing is less than on most ball bearings. Sleeve bearings can be made just as dust excluding as any ball bearing, and in some cases ball bearings could not be used where sleeve bearings have been used for years.

A good bearing should be 80% tin, and not 80% lead, as used in some motors. A tin bearing costs five times as much as lead, but is seven times better. Some users now specify 80% tin babbitt.

Stiff shafts and heavy frames are essential to successful operation. One manufacturer claims advantages for his motors because they are so light that they can be moved easily, and there is not so much freight to pay. Some argument! [illegible] like a coal dealer who gave 1,800 pounds to a ton because he did not want [illegible] worn out carrying the extra 200 lbs. upstairs.

Good Insulation Important

Any properly insulated motor will run in fresh water. If a motor won't do so there is some poor insulation used. Great care has to be used in making the end connections. They have to be made by hand, and are liable to have copper exposed. Open slots and form wound coils should be used in all, except small motors, ten h.p. and under. The insulation can be put on better and repairs can be more easily made than with the closed slot instruction. Many companies use more slot liner insulation alone than others use on entire coils. Good insulation is costly, and is one factor making a good motor cost more than a cheap one, but the good one is the cheapest in the end. A cheap motor is at least an object of suspicion. No one can make a motor cheaper than the standard companies without omitting something. It may be simply brains, that is left out, but there is surely something. Nothing is easier to hide than poor insulation. Many fine mechanical motors have been wrecked by poorly insulated coils.

With regard to the type of motors to be used, ninety per cent. of the induction motors are of the squirrel cage type. In only a few cases under 200 h.p. is it necessary to use wound rotor motors. They have no advantages over squirrel cage other than at starting. On variable speed work in general a wound rotor has to be used, but in many cases a squirrel cage would be just as good. The weak point about the squirrel cage is the compensator or starting device. There are few good ones on the market. They are always skinned to make a low price, but it is poor economy. Generally in a large plant you will find several compensators out of commission. Here is a big chance for someone to invent a good starter, or improve on the present ones.

Uses of Motors

Many unusual and new uses have been found for induction motors in the past ten years. Motors of 30,000 h.p. are now being designed for battleship propulsion. Steam turbines must run at high speed. Direct connect them to a generator feeding into an induction motor which may run at any propeller speed, doing away with gears, reversing turbines, and the like. The induction motor can be reversed by merely changing two lines with a switch, and can be run at three fixed speeds with one winding, and at intermediate speeds if a wound rotor is also used. Some of these equipments are now in successful use. The squirrel cage sizes of this type are of special construction, having a high resistance winding for starting which automatically becomes a low resistance running.

Six thousand to eight thousand h.p. motors are now made for steel mill service which have a speed both above and below synchronous speed without any changes being made in the windings. This is accomplished by speed regulating auxiliaries.

Motors running at 3,600 r.p.m. up to 4,000 h.p. can easily be designed, and much greater capacity if there is any demand. The problem of high speed electrical apparatus is almost entirely mechanical. The electrical design is easy; the most difficult part being to provide against the enormous forces called into existence by short circuits. Some very fine machines were wrecked a few years ago because the electrical stresses on short circuit were not taken into consideration. A few have exploded due to mechanical defects. Some steam turbine generators run higher than 36,000 feet per minute.

The squirrel cage type of rotor being the most used we will devote a few words to that. It should have sufficient resistance to give good starting torque, say, two times full load torque at starting with four to five times full load current up to about 100 h.p., and more or less on special apparatus. The windings should be without insulation firmly pressed into closed slots, and the end rings fastened to the bars by some welding process. Welding is much better than casting, and there is now no excuse for casting end rings to bars or soldering or bolting. They can be welded cheaper than by any other process of fastening, and many old type bolted or soldered are being changed to welded. The butt electric weld is very good, but the brass welded by any temperature high enough is just as good and in some cases better. The only trouble about welding is to have good operators and such are none too plentiful.

Air ducts in a motor are an abomination. They enable one to get motors past testing departments without heating, but in many instances the ducts get plugged in use by dirt which in some installations cannot be removed by compressed air. Flour and oatmeal dust are sticky and cement themselves so thoroughly that no blowing will remove them from the air duct. As soon as the ducts are plugged the motor gets hot and in some instances the load has to be cut down to about two-thirds of what the motor is supposed to carry. Motors can be furnished without ducts at somewhat higher prices than the ordinary motor. Ducts being mostly air cost less than iron and copper.

Many motors are cooled by fans; this is a sign of a skimped motor, but is widely used. High speed apparatus may require fans but no moderate speed motor should have a fan although most do.

Circulating Currents in Lighting Transformers

By F. Keith D'Alton

When two single phase transformers of the same capacity with the same voltage ratings and designed for the same frequency are connected together in parallel, it does not at first appear that there is liable to be a current, or component of current, circulating between them. Differences in impedance, either in magnitude or phase angle, or both, will cause a circulating current under load which appears as a component in the load current of each transformer, but does not appear at no load.

The circulating current which we will consider in the following calculations is, therefore, the current due to impedance differences, and it will be seen that the power factor of the actual load does not affect the result. Transformers of the same capacity do not necessarily divide the load equally.

In Fig. 1 we are considering that transformer No. 2 is in parallel with transformer No. 1; that the impressed primary voltage on each is E, the secondary voltage e and, in order to make our calculations general, that E^1 represents the primary voltage in terms of the secondary.

i.e., $E^1 = E/\text{Ratio}$

The primary circulating component of current equals the secondary circulating component divided by the voltage ratio of the transformer; this holds for all cases now to be considered.

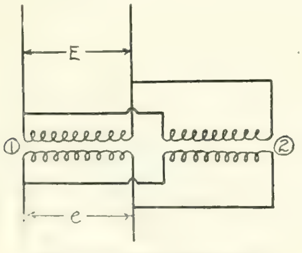


Fig. 1—The parallel connection of transformers with notation

In terms of the secondary circuit, r_1, x_1 and z_1 are respectively the equivalent resistance, reactance and impedance of transformer No. 1; similarly r_2, x_2 and z_2 represent the corresponding quantities in transformer No. 2. Also, i_1 and i_2 are the secondary load currents in these transformers. In the vector diagram of Fig. 2 one transformer alone is considered. Here i_1 is the secondary current, e_1 the secondary voltage.

E^1, the impressed voltage in terms of the secondary voltage, will then be equal to the vector sum of three quantities, namely e_1, $i_1 r_1$ and $i_1 x_1$, where $i_1 r_1$ is a "voltage drop" vector parallel to i_1, and $i_1 x_1$ is a reactance voltage vector in quadrature with i_1. We now obtain the quantity v which is the total drop, or impedance volts in terms of the secondary voltage. The magnitude of the quantity v for any given transformer is independent of the power-factor of the load but is directly proportional to the magnitude of the load current of that transformer.*

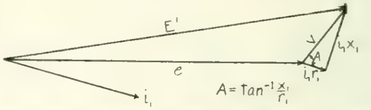


Fig. 2—The phase relations of primary and secondary voltages in a typical single-phase transformer

The impedance phase angle of transformer No. 1 is A, or the angle whose tangent is x_1/r_1; similarly with transformer No. 2, the impedance phase angle B is that angle whose tangent is x_2/r_2.

Referring again to Fig. 1, it is obvious that v is the same for both transformers in parallel (neglecting resistance of lines should the transformers be separated by some distance) and that the division of load will be such as to make it so. Consequently, the transformer with the greater impedance will take less current than the other.

$$v = i_1 (r_1 + jx_1) = i_1 \sqrt{r_1^2 + x_1^2} = i_1 z_1$$

$$= i_2 (r_2 + jx_2) = i_2 \sqrt{r_2^2 + x_2^2} = i_2 z_2$$

Total load current, $I, = i_1 + i_2$, added vectorially.

The circulating component of current will be represented by c_1 in transformer No. 1, and by c_2 in transformer No. 2. With only two transformers, obviously, $c_1 = -c_2$.

Case 1.—Two transformers with equal total impedances but different impedance phase angles.—Fig. 3.

Assuming load conditions to be constant and, therefore, v fixed, transformer No. 1 will have a secondary current i_1 equal to v/z_1 in magnitude and lagging behind v by the angle A, where $\tan A = x_1/r_1$.

Transformer No. 2 will have a secondary current i_2 equal to v/z_2 in magnitude (which, in case 1, equals v/z_1 since here $z_1 = z_2$) and lagging behind v by the angle B where $\tan B = x_2/r_2$.

I is total load current; but the circulating current is evidently a component in each transformer secondary current, and does not contribute to the value of I. It will be observed that the component c_1 in transformer No. 1 is equal but opposite in phase position to the component c_2 in transformer No. 2; that is, $c_1 = -c_2$.

---

*In these calculations the exciting current is not taken into account, its effect being so small that it does not appreciably change the result.

Hence c_1 or c_2 must be the value of circulating current, as it is present in each transformer but not in the load currents.

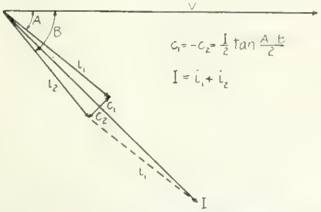


Fig. 3—Division of load and value of circulating current with two transformers having equal total impedances but different impedance phase angles

To calculate the value of c_1 note that

$$c_1/\tfrac{1}{2}I = \tan\tfrac{1}{2}(B-A)$$

$$\text{or } c_1 = \tfrac{1}{2}I\tan\tfrac{1}{2}(B-A) = -c_2$$

$$c_2 = \tfrac{1}{2}I\tan\tfrac{1}{2}(A-B) \text{ as shown in Fig. 3.}$$

The secondary circulating component of current then equals half the load current multiplied by the tangent of one-half the difference in impedance phase angles, and is in quadrature with the load current.

Case 2.—Two transformers with unequal total impedances but the same impedance phase angle.—Fig. 4.

The phase angle between v and i_2 will now equal the angle between v and i_1, hence i_1 and i_2 will be in phase with each other.

$$i_1 = v/z_1 \text{ and } i_2 = v/z_2.$$

Fig. 4 shows these two currents in position relative to v.

$$I = i_1 + i_2$$

$$c_1 = \tfrac{1}{2}(i_1 - i_2) \text{ and } i_1 = \tfrac{1}{2}I - c_1 \text{ whereas } i_2 = \tfrac{1}{2}I + c_1$$

The circulating current may then be considered as being in phase with the load current and showing itself in an unequal division of load. The division of load in this case (2) is inversely proportional to the impedances of the transformers.

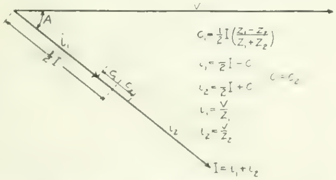


Fig. 4—Division of load and value of circulating current with two transformers having unequal total impedances but the same impedance phase angle

Now circulating component $= \frac{1}{2}(i_1 - i_2)$ or $\frac{1}{2}(i_2 - i_1)$, in magnitude.

$$\tfrac{1}{2}(i_2 - i_1) = \tfrac{1}{2}(v/z_2 - v/z_1) = \tfrac{1}{2}v(z_1 - z_2)/z_1 z_2$$

$$\text{but } v = I(z_1 z_2)/(z_1 + z_2) \text{ (in case 2 only)}$$

Hence circulating current

$$= \tfrac{1}{2}I(z_1 z_2)(z_1 - z_2)/(z_1 + z_2)(z_1 z_2)$$

$$= \tfrac{1}{2}I(z_1 - z_2)/(z_1 + z_2) = c_1 = -c_2$$

This gives the secondary circulating current. The primary circulating current will be c_1/Ratio, or c_2/Ratio.

The circulating component then is equal to half the load current multiplied by the difference in the impedances and divided by their sum. Impedances may be taken in percent.

Case 3.—Two transformers having unequal total impedances and also different impedance phase angles.—Fig. 5.

This is the more general case. Calculating the value of the circulating current in this case, let us consider it as the combination of cases 1 and 2. We would add vectorially the components m and n (Fig. 5) where n is the result from case 1, and m the result from case 2. Doing so we have

$$c_1 = \tfrac{1}{2}I\,[\tan\tfrac{1}{2}(B - A) + j(z_1 - z_2)/(z_1 + z_2)]$$

Actually in magnitude,

$$c_1 = \tfrac{1}{2}I\sqrt{\tan^2\tfrac{1}{2}(B - A) + (z_1 - z_2)^2/(z_1 + z_2)^2}$$

This, however, is only an approximate formula, since it assumes that the angle between m and n is 90° and also that the angle between n and I is 90°, which, of course, cannot exist until $(B - A) = 0$, but is approximately a fact where the difference in phase angle $(B - A)$ is small, say not more than five degrees.

The phase angle between the circulating current and the load current (also approximately) is the angle whose tangent equals n/m or is equal to

$$(z_1 + z_2)\tan\tfrac{1}{2}(B - A)/(z_1 - z_2)$$

The general formula which must necessarily take into account the resistance and reactance components of impedance in each transformer is much more complicated than that given above and is as follows:—

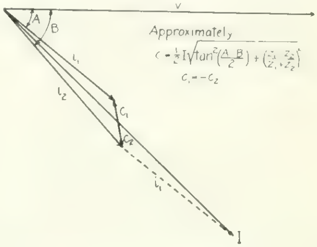

V
A
B
Approximately
$c = \frac{1}{2}I\sqrt{\tan^2\left(\frac{A-B}{2}\right) + \left(\frac{Z_1-Z_2}{Z_1+Z_2}\right)^2}$
$c_1 = -c_2$
i_1
i_2
c_1
c_2
i_1
I

Fig. 5—Division of load and value of circulating current with two transformers having unequal total impedances and also different phase angles

$$c_1^2 = \frac{I^2}{4}\,\frac{\left(\dfrac{r_1}{r_1^2+x_1^2} - \dfrac{r_2}{r_2^2+x_2^2}\right)^2 + \left(\dfrac{x_2}{r_2^2+x_2^2} - \dfrac{x_1}{r_1^2+x_1^2}\right)^2}{\left(\dfrac{rr_1}{r_1^2+x_1^2} + \dfrac{r_2}{r_2^2+x_2^2}\right)^2 + \left(\dfrac{x_2}{r_2^2+x_2^2} + \dfrac{x_1}{r_1^2+x_1^2}\right)^2}$$

In magnitude, of course, $c_2 = c_1$

The phase angle between c_1 and I will be such that its tangent equals

$$\left(\frac{x_2}{r_2^2+x_2^2} - \frac{x_1}{r_1^2+x_1^2}\right) \quad \left(\frac{r_1}{r_1^2+x_1^2} - \frac{r_2}{r_2^2+x_2^2}\right)$$

To apply this formula in Case 1 we must consider that total impedances are equal.

Then $r_1^2 + x_1^2 = r_2^2 + x_2^2$

The general formula of Case 3 then resolves itself into the form we developed in Case 1.

To apply the general formula in Case 2 we must consider that though different impedances exist the transformers have the same impedance phase angle. This implies that $r_1/r_2 = x_1/x_2$ and we then resolve our general formula into the same that we obtained originally in Case 2.

Examples

Case 1.—Let the difference in impedance phase angle be 5°. Let the total load current be 200 amps. $I = 200$.

The actual voltage, capacity and power-factor of the load do not affect the result in any way; the voltage and capacity are, of course, taken into account more or less directly in the magnitude of their impedance.

[illegible]

or 4.37% of full load current.

Case 2.—Assuming the same total load current as before, let the impedances of transformers 1 and 2 be respectively 5% [illegible]

[illegible]

or 11.7% of full load current.

Case 3.—Let now these two conditions of cases 1 and 2 exist at the same time.

$c_1 = \sqrt{(4.37)^2 + (11.1)^2} = 12.0$ amperes.
$= 12\%$ of full load current.

If we used here the absolutely accurate formula we get the value of c_1 to be 12.2 amperes.

Heating

In case 1 the component contributes to the heating of both transformers and the additional loss due to the circulating current alone will be $c_1^2 r_1$ in transformer No. 1, and $c_2^2 r_2$ in transformer No. 2 [illegible]

In case 2 the component will cause additional heating in one transformer and a reduction in heating in the other. If z_1 be greater than z_2, the additional heating will be in transformer No. 2, and will equal

[illegible]

In case 3 the increase or decrease in heating depends upon the difference in magnitude of impedance as well as difference in phase angles. The reduction in current due to the latter, being high, may in one transformer just counterbalance, or even more than neutralize the increase due to the quadrature component. In the other transformer there will be increased heating due in part to each component.

Notation:

E = primary impressed voltage.
E' = impressed voltage in terms of secondary voltage.
e = secondary voltage.
v = impedence volts in terms of secondary voltage.
i_1 = secondary current of transformer No. 1.
[illegible] = secondary current of transformer No. 2.
I = total secondary load current.
c_1 = circulating component in secondary transf. No. 1.
c_2 = circulating component in secondary transf. No. 2.
r_1 = effective resistance of transf. No. 1 in terms of sec.
r_2 = effective resistance of transf. No. 2 in terms of sec.
x_1 = reactance of transf. No. 1 in terms of secondary.
x_2 = reactance of transf. No. 2 in terms of secondary.
z_1 = impedance of transf. No. 1 in terms of secondary.
z_2 = impedance of transf. No. 2 in terms of secondary.
A = impedance phase angle of transf. No. 1.
B = impedance phase angle of transf. No. 2.

Water Powers of Quebec

In the course of his budget statement in the Quebec Legislature, the Hon. W. Mitchell referred to the policy of the Government in developing the water powers of the province. He stated that the investment of $2,894,057 on the St. Maurice River water storage and the St. Francis River water storage brings on contracts alreay executed a sum of $251,079 per annum, and as the years go on this income will increase with the building of new manufacturing plants, and the increase of the sale of the power. Therefore, at no distant date the Government will be entirely repaid for its outlay, and, in addition, will receive a substantial income from these works.

Electric Propelling Machinery of the U.S.B.S. Tennessee

By Mr. W. H. Easton

When the United States battleship Tennessee was launched at the Brooklyn Navy Yard one of the most formidable machines of its kind in existence was set in motion. The speed of the Tennessee will permit her to equal any vessel of her class. In addition to her speed it is stated that she will be able to shoot harder and stand more punishment than any other vessel afloat. Her overall length is 624 ft.; beam 97 ft.; draught, 31 ft.; and full load displacement, 33,000 tons. She will mount twelve 14-in. guns of 50 calibre, twenty-two 5-in. guns of 51 calibre; two 3-in. anti-aircraft guns; four saluting pieces; and two 21-inch submerged torpedo tubes. Her armour protection, which is said to be as complete as naval science can make it, is to consist of 14-in. plate at the belt, 8-in. aft, and 3-in. at the deck hands, with special protection against torpedo attack. Her complement will be 1119 officers and men. She will be propelled by electricity, supplied by two turbine-driven generators, and each of her four propellers will be driven by its own motor. Her maximum power will be 33,500 horsepower, and her maximum speed over 21 knots per hour.

The Navy Department had experimented with electric drive for several years and has decided to use it on the new battleships because its use permits greater freedom in the design of the ship. With geared turbines, the turbines and propellers are connected together by means of shafts and gears, and there is little leeway in the location of the engine room. With electric drive, however, the turbines and propellers are entirely separate mechanically, and the former can be placed in almost any desired location. This flexibility is of special importance in battleship construction for it permits greater consideration to be given to purely military factors, such as the arrangement of magazines and the protection of vital parts. In fact, owing to the freedom of locating bulk heads, it is possible to make an electrically operated battleship practically torpedo proof. The motors can be placed well aft, so that the length of the propeller shafts can be reduced to a minimum; and the turbines can be so located with reference to the boilers and condensers that steam, oil, exhaust, and other important pipe lines can be made as straight and short as possible.

The Turbines

The turbines of the U.S.S. Tennessee are of the Westinghouse single-cylinder, semi-double flow, impulse-reaction. The high pressure steam first passes through a two-row impulse wheel in each turbine and then through a section blading. It then divides into two equal parts and each part passes through a low-pressure reaction section into the condensers. The speed of the turbines can be varied through a range of from 1,500 to 2,270 rpm., by means of manually-controlled hydraulically-operated governors. The speed of the turbines, as determined by the setting of the governor, remains practically constant, regardless of the load, and hence the propellors do not race when they leave the water in rough weather. Automatic stops are also provided, which cut off the steam in case the speed of the turbines exceeds a safe value.

The Generators

The generators, which are direct connected to the turbines, are two-pole Westinghouse machines, and supply the motors with 3-phase, 3,400-volt alternating current at frequencies ranging from 25 to 38 cycles, depending on the turbine speed. They are excited from the direct-current power supply of the ship and each can develop 15,000 kv.a. at the maximum speed of the turbine. The generator coils are very carefully insulated so as to prevent injury from high temperature, moisture, and accumulations of salt. They are kept cool by air which is forced through the ventilating ducts by fans mounted on the rotor shafts.

The Motors

The four motors are of the Westinghouse induction type. They are direct-connected to the propellers, and each can develop a maximum of 8375 h.p. continuously. To provide a sufficiently wide speed range, each has two windings, one of 24 poles and the other of 36 poles. The same result could have been obtained by the use of a single-winding, but this would have involved greater complications in the connections and would have restricted the design in other ways. The 24-pole winding is connected to slip-rings on the rotor shaft, while the 36-pole winding has short-circuiting connections and is equivalent to a squirrel-cage arrangement. Both windings are used for running, but only the 24-pole for starting and reversing, resistance being inserted in series with it during these operations. The insulation of the motor is similar to that of the generators, and ventilation is provided by means of two motor-driven fans mounted on the top of each motor.

Speed Control

The method of controlling the speed of the motors can be readily understood by considering that the 36-pole winding is equivalent to a gear of an 18 to 1 ratio between the turbines and the propeller, while the 24-pole winding is equivalent to a gear of a 12 to 1 ratio. Hence when the 36-pole winding is used, the motor-speed will vary from 83 to 126 r.p.m., when the turbine speed is varied through its range of 1,500 to 2,270 r.p.m., and with the 24-pole winding, the motor speed ranges from 126 to 186 r.p.m. To control the speed of the ship, three different combinations are employed:

1. From 9 to 15 knots per hour. The motors are operated on the 36-pole windings, and all four are driven by one turbo-generator.
2. From 15 to 17 knots per hour. The motors are operated on the 24-pole windings by means of one turbo-generator.
3. From 17 to 21 knots per hour. The motors are operated on the 24-pole windings, by means of both turbo-generators.

To reverse, two phases at each motor are transposed without changing the direction of rotation of the turbo-generators.

Steam Consumption

The use of one turbo-generator for the lower speeds assists in maintaining good operating ecenomy by keeping the load on the unit close to its rated capacity except at the very slowest speeds. The steam consumption per shaft horsepower-hour, including that required for excitation, condenser operation, and motor ventilation, is as follows:

Speed in Knots	Motor-Poles	No. Turbo Units	Lbs. of Steam
9	36	1	16
15	36	1	12
15	24	1	13
17	24	1	12
17	24	2	12.1
19½	24	2	11.7
21	24	2	11.9

All the switching apparatus for controlling and distributing the power to the motor, for regulating the main turbines, and for controlling the excitation of the generators, is located in a control room, where the operator has directly in front of him everything necessary for the operation of the equipment. Full advantage has been taken of the great facility with which electric current can be measured inasmuch as the data thus obtained greatly assists in the operation of the ship.

The rheostats used for starting and reversing the propeller motors are of the automatic liquid type, in which the resistance is varied by means of a pump, the level of a liquid in which fixed electrodes are immersed. This type of rheostat, though not as yet extensively used by the navy, has become very popular in industrial service because of its simplicity, compactness, and reliability.

The cables connecting the generators and motors are of great importance because the operation of the ship depends upon their reliability. In order to insure the best possible type of construction, a Committee of the American Institute of Electrical Engineers assisted the Navy Department in preparing the specifications for these cables.

Auxiliaries

The main circulating pumps are of the centrifugal type and are operated by 235 h.p. motors. Their speed can be varied to suit conditions so that the power consumption can be reduced with the speed of the ship. LeBlanc air ejectors, which are novel on this class of ship, maintain a high vacuum in the condensors. The condensate is handled by motor-driven vertical centrifugal pumps. Thus all the main engine room auxiliaries are rotary and are motor driven, which, it is believed, will insure a higher degree of reliability than the use of some of the older forms of equipment.

Good Annual Statement of Southern Canada Power Company

The annual statement of the Southern Canada Power Company, Ltd., for the year ended September 30, 1919, showed gross earnings of $566,091. This compares with $475,009, in 1918, and $432,634, in 1917. The surplus for these three years is 58,064, $48,157 and $47,347 respectively. The total assets are now placed at $8,425,707 as against $6,892,932, a year ago. The report shows that a considerable amount of construction work has been carried to completion during the past year; this may be depended upon to increase, very considerably, the earnings for 1920. Among the items mentioned in the report are the following:

"Transmission lines from Drummondville through Actonvale to Sherbrooke and St. Hyacinthe, which were under construction a year ago, have been completed and put into operation.

"During the year the distribution plants were extended to take care of the requirements of over a thousand new customers, bringing the total number to slightly over nine thousand customers, which the company was serving at the close of the fiscal year.

"The new power development at Drummondville has been completed, and is now in successful operation. The dam, forebay head works, etc., are completed for the ultimate eighteen thousand horsepower development. The power house has been completed for the first two units, with a capacity of thirty-five hundred horsepower each, which are now in operation."

The board of directors and officers of the company, reelected without change for another term, are as follows: W. C. Hawkins, president; Jas. B. Woodyat, general manager; W. K. Baldin, M. P., Jas. Davidson, J. S. Gillies, W. H. Miner, A. J. Nesbit, George Parent, M. P., Chas. E. Read, J. M. Robertson, Harry Sifton, and Lt.-Col. J. R. Moodie, with L. C. Haskell as secretary-treasurer.

Turbo-Generator Troubles in Western Canada

Electrical Engineer's Office,
City of Calgary, Alta., Dec. 3, 1919.

Editor Electrical News:

In the last year several very interesting instances of trouble with turbo-generators have happened in Alberta power plants. Up to date five machines totalling 10,000 kw. capacity have been put out of commission beyond ordinary repair by the same defect. All five machines are of foreign manufacture which indicates that the design is at fault and that the trouble is not characteristic of any one machine.

In the turbo set at Calgary, Alberta, the first sign of trouble appeared as a slight vibration of the entire machine but it was not considered very serious until the turbine blades started to strip. After replacing the blades the same vibration was experienced. To determine whether the vibration was due to the turbine or to the generator, the two machines were disconnected. The turbine was started up and no vibration took place. To run the generator as a motor, a spare turbo-generator was connected by cables to it and the machines started up together with full excitation on both. At about half speed the faulty generator showed signs of vibration. Upon tracing the trouble it was found to be due to short circuited turns in the rotor field windings. This produced a magnetic unbalance of the rotor and caused the vibration which eventually stripped the turbine blades. The field winding insulation was found to be fullerboard and presspan instead of micarta or similar material which is the generally accepted type of insulation now in use by the leading manufacturers.

All five machines mentioned above showed the same symptoms of trouble and resulted in the stripping of turbine blades. Some of the generator rotors have been rewound with other than mica insulation, but without success, which seems to indicate that micarta or similar insulation is the only reliable insulation to be used for this work.

Some engineers may argue that as the excitation voltage is only 125 or 250 volts, there should not be much potential stress on the windings and high grade insulation is not essential. Under normal operating conditions the voltage on the field is 125 or 250 volts but under short circuit or sudden increases of load it has been found that there is a voltage induced in the field windings due to the transformer effect of a heavy rush of current in the armature winding This induced voltage is a great many times the normal excitation voltage.

In Mr. C. P. Steinmetz's book on "Electric Discharges, Waves and Impulses" some oscillograph curves of a 1,500 kw. turbo-generator under short circuit are shown. At the instant of short circuit the field current rose to 12 times normal excitation. This means that the induced voltage in the field windings and the voltage difference across the windings rose to approximately 20 times normal or 2,500 volts: so that, while we have only 125 volts on the field windings normally, we may have as much as 2,500 volts under abnormal conditions. The phenomenon mentioned above of course happens long before any oil switch can open the circuit and only lasts for a fraction of a second.

This phenomena has been recognized by the designers of modern plants in the States and has been taken care of to some extent by an electrolytic cell by-pass which is placed in parallel with the field windings. When the voltage across the field rises above the breakdown voltage of the electrolytic cell there is a discharge across the cell which relieves the induced voltage in the field windings.

Yours truly,

J. N. Lightbody, Engineer.

Motor Truck Competition

A Discussion of How It May Be Met—Three Things That the Railways Must Do

By W. J. Whiteside[*]

Motor Truck service competition may be considered as of two classes: That operated to transport merchandise from one place to another for the benifit of the owner (usually a manufacturer or merchant), and that for revenue only, or designed to transport merchandise for others, a charge being made for such service.

In western New York State both classes of motor truck service have been increasing to an alarming extent, and the competition caused thereby has entailed a loss of large tonnage to the electric lines' freight service and a corresponding loss of revenue; and although considerable thought has been given by electric line operators as to what could be done to overcome this strong truck competition nothing of a definite nature has been acomplished.

It has been said "the motor truck operator for revenue only" cannot make it pay and will be compelled in time to quit. This, to my mind, is a big mistake, at least between short-haul points where the owner is favored in two ways: (1) By actively soliciting new business in the territory served and limiting the number of privately owned trucks for personal use and benifit, thereby securing full tonnage between short-haul points at all times; and, (2) being favored with good roads, seasonable weather and other conditions to permit regular daily truck service between the points covered.

I have found in the Buffalo territory that a 5-ton truck can operate at the same rate as charged by the electric lines between short-haul points and make a good profit. For example, between Buffalo and the fruit belt of Lake Ontario, the truck would pick up a shipment at the packing house on a farm, haul it to the commission merchant's place of business in Buffalo, charging the same rate per 100 lb. as the electric line, with two handlings of the shipment, as against the farmer delivering the shipment to the freight house of the electric line, where it is loaded in a freight car, transported to Buffalo and transferred to a carting truck for delivery to the commission merchant's place of business, making four handlings of the shipment. The cost of operation and net return for one round trip per day, the truck capacity being 5 tons, is as follows:

Gross revenue, 10,000 lb. at 30 cents per 100 lb.		$30.00
Cost of operation:		
One chauffeur	$5.00	
One helper	4.00	
Gas and oil	5.00	
Depreciation	5.00	19.00
Net profit		$11.00

Where the chauffer is the owner of the truck, his daily earnings would be $16. These figures were furnished to me by an automobile operator and he fixed the cost at a conservative figure. However, the depreciation of $5 per day is too high. Trucks of 1½-ton and 3½-ton capacity can also operate with profit, based on the same cost with the wage of helper eliminated.

At the present there are now operating between Buffalo and Lockport six trucks; between Buffalo and Erie, Pa., two trucks; Buffalo and Rochester, N. Y., five trucks; Buffalo and Jamestown, N. Y., one truck, and between Buffalo and Cleveland, Ohio, with a transfer at Erie, Pa., one truck, while between Buffalo and Niagara Falls, N.Y., where no electric line freight service is being operated, there are seventeen trucks. While on these various routes the schedules are not all daily, still the volume of traffic by truck is sufficient to take away from the electric lines tonnage of large amounts. Practically all trucks operated are of the 1½-ton to 5-ton capacity. These trucks are owned by motor truck operators for revenue only, and this service is augmented by trucks privately owned.

---

[*] Traffic Agent International Railway, Buffalo, before N. Y. Electric Railway convention

Manufacturers who have one or more trucks for use locally often figure that if shipments must be delivered to and received from the freight house of the electric line, they can make deliveries and receive shipments for themselves between short-haul points without inconvenience and delay and in this way save freight charges as well as carting charges. As the number of such personally owned trucks is increasing, the electric lines are further menaced in the operation of freight service by decreased tonnage and revenue.

The motor truck service for long hauls, while it is and has been quite a factor in competition, is operated almost exclusively by the "motor truck for revenue only operators" and at the start dazzles the operator with its possibilities of great return, but sooner or later the halo of great return fades away, and the operator finds himself possessed of worn-out trucks and empty pockets and discontinues the service on account of poor return. This, I believe, is caused by lack of full tonnage on all long-haul trips, length of time in making trips, maintenance of trucks and delays caused by bad road conditions, weather and other factors, so that the patron of the truck becomes dissatisfied and either purchases his own truck or avails himself of the electric line freight service. The personally-owned truck does not figure very strongly in the long-haul service because it would mean the loss of the use of the truck locally for extended periods, and with large concerns the truck cannot be spared for practically the greater part of a day to save freight charges of the electric lines.

While operators of motor trucks "for revenue only" may lose money and discontinue, there will always remain the truck owner who thinks there is a fortune in the business and start service, believing he can make it pay, and in this way continues the competition which menaces the electric line freight service.

Remedies are badly needed, and from a freight agent's point of view, three plans are worth consideration:

Electric lines should have live, soliciting freight agents, capable of meeting the shipper in such a manner that by putting before him the frequent service offered by the company, the reasonableness of the rates for the class of service operated and the responsibility of the company in the payment of just claims as against service offered by the truck operator, who in almost every case is irresponsible when it comes to paying loss or damage claims.

Where claims are legitimate, payment should not be delayed, as otherwise the business of the shipper or consignee making the claim is likely to be lost to the company.

Shippers and consignees soon learn when shipments should go forward and arrive at destinations, and if schedules are not maintained, the consignees become dissatisfied and purchase their own truck or turn to some other transportation service.

I feel that the electric and steam lines are entitled to some relief and protection to their freight service against motor truck service, and that the cost of building state and country roads should be paid, in part at least, by motor truck owners according to the tonnage of the truck operated, and that motor trucks operated for revenue should be subject to the jurisdiction of the Public Service Commission of the State as to the rate and schedules, and that they be financially responsible to shippers as to payment of any claims.

More Than One-Sixth of the Electric Railway Mileage of the United States is in the Hands of Receivers

The incredible condition of the electric railway companies in the United States is shown by a recent statement of Mr. G. E. Tripp, chairman of the board of directors of the Westinghouse Electric & Supply Co., to the effect that more than one sixth of the mileage of that country is in the hands of receivers. Mr. Tripp said that with respect to the judgment used in making this investment, the facts are all favorable. From the beginning to the present time street railroads have had all the fundamentals of a sound investment. They furnish now and always have furnished an indispensable service to our suburban population. The very existence of modern community life depends upon this form of transportation, and, after water and sewerage, it is the most important public utility. In short, if our urban communities have made for the wealth, comfort and culture of this country, then an investment in street railway transportation is in one of the cornerstones of the structure; and, if the investment is in danger, it is not because of poor financial judgment.

More than a sixth of the total electric railway mileage of the country is in the hands of receivers. A very large additional number of companies are on the verge of bankruptcy, some of them kept from this fate only by the financial strength of the much criticized "holding" companies. Alone of the important industries of the nations, the electric railway industry nearly suffered annihilation through conditions caused by the war, and back of all these facts is the further and by all means the most important fact that the industry, by reason of restrictions in statute law, in ordinances and by franchises is unable to take measures to save itself from the fate which events show to be imminent.

The restoration of credit is fundamental to the continuance of private capital and private enterprise in the public service, and the main task that confronts the country, insofar as the electric railways are concerned, is the restoration and the future preservation of that credit.

The street railway problem has passed the stage where it is simply a concern, of the owners and operators of the properties. They have lost and are losing a great many millions of dollars and for them the situation is deplorable enough, but the communities, and through the communities you men of business, the workmen, the ordinary everyday citizens, are to-day threatened with the loss or demoralization of a service that is absolutely necessary if business is to continue in our large urban centres, if the health and morals, and comforts and convenience of our citizens are to be preserved.

One of the systems that continues to put up a stiff fight for its existence and its rights is the Twin City Rapid Transit Company. This was always considered one of the best maintained systems on the continent—which, doubtless, accounts for the fact that the service has been maintained at the former standard in spite of increased costs and expenses. A few days ago a by-law covering the city of Minneapolis, where a new service-at-cost-franchise extension was asked for, was defeated by the electors, though it had been previously approved by the city council. The explanation of the defeat as given by the "Commercial West" is not so much the adverse attitude of the people toward the company as it is their objection to grant any kind of franchise [illegible] This paper adds the following general comment

The final solution of this traction problem will not be found in any franchise granted by the city council, no matter what its terms may be. The experience of the majority of the other states of the Union clearly points to the one logical thing to do, and that is to place traction companies under the control of a state public utilities commission. Minnesota already has a railway and warehouse commission that could be given enlarged powers to supervise the traction companies of the state. The records of our neighbor state, Wisconsin, and many others who have followed this plan, proves conclusively that this method of handling public utilities is far superior to that of municipal control.

The situation in Minnesota, with Minneapolis, St. Paul and Duluth served by one traction corporation, makes it especially desirable to utilize this state commission plan. This will do away with all local franchise granted by city councils and will give the greatest assurance for adequate service. The city councils lay their demands before the state commissions and the traction companies present their side of the case, and this judicial commission employs the services of the very best engineers and auditors, and their decisions are usually in the best interests of the public.

The various heads of these state commissions have a national organization and are constantly studying all the numerous problems brought out by various public utility companies. What the public demands first of all is adequate service and development of public utilities to meet the growing needs of each city. Under a state commission the corporations have a permanent lease for doing business, provided they behave and deal fairly with the public. The business of the companies thus being on a permanent basis, they are in a position to command needed capital for improvements and extensions and the entire matter is removed from the arena of city politics.

Want Increased Rate

Before the Public Utilities Commission on Dec. 17, at St. John, the New Brunswick Telephone Company filed an application for increased telephone rates in New Brunswick. It declares that it requires an additional revenue of $264,000. The schedule includes introduction of the measured service as in Halifax.

Automatic Telephones in Montreal

In a recent interview Mr. L. B. MacFarlane, president of the Bell Telephone Company of Canada, is reported to have stated that future new branch offices in Montreal would be equipped with the automatic telephone system. Mr. MacFarlane is also reported to have stated that they were considering the advisability of installing the same system in new branches in Toronto.

Wolfville Plant Municipalized

The town of Wolfville, N.S., has purchased the plant of the Acadia Electric Light Company. The price given for the entire equipment and property was $20,000. It is the intention of the town to purchase current from the new Hydro-electric plant being installed by Messrs. C. H. Wright and Jowdry, and to shut down the present steam plant. This new arrangement will give the town a 24-hour service. Mr. D. E. Heales is chairman of the Electric Light Commission.

Winnipeg Awards Contracts

A contract has been awarded by the city of Winnipeg for six 5,000 kv.a. single-phase, transformers. Three of these are being supplied by the Canadian General Electric Company and three by the Canadian Westtinghouse Company.

Ask for Inquiry into Company's Affairs

The City of Montreal will ask the Railway Commissioners, before a permanent tariff for the Bell Telephone Co. is fixed, to make an inquiry into the affairs of the company, and to make a valuation of the company's properties. The city is of opinion that this is necessary in order to arrive at a permanent tariff.

Will Guarantee Bonds

The New Brunswick Legislature, at its next session, will introduce a measure to encourage the development of the water powers of the province. A statement recently made by Premier Foster intimates that his government will give encouragement to either municipal or private capital by guaranteeing bonds for any Hydro-electric work, providing the plans are submitted for approval to the province's Water Power Commission.

Diesel Plant for Virden

The Provincial Power Commission, Winnipeg, have under consideration the construction of an electric lighting plant at Virden, Man. The proposed plant includes a Diesel engine, generator and all necessary equipment for the distribution of power. A by-law will be submitted in the near future.

A committee of citizens of Grand Mere, P.Q., reports that the city is selling its electric power at less than cost price—87/100 of a cent per kw.h., while the cost of operating the plant is over 1 cent per kw.h. An advance in price is recommended.

The town of St. Lambert, P.Q., have taken over from the Waterman Co. the supply of light and power for the town. The transfer involved the laying of certain new connections, the change being made under the supervision of Mr. E. Leroyer, superintendent of the light and water department.

Mr. Jules Hurteau has been appointed electrical superintendent for the Canadian Axelite Company at Shawinigan Falls. He was formerly with the Laurentide Co., Grand Mere.

The British Aluminium Company, 265 Adelaide St. W., Toronto, are distributing a leaflet outlining the various applications of aluminium in the construction of electric cars.

Obituary

The death of Mr. Charles W. Brown, formerly manager of the Northern Electric Co., is reported. Mr. Brown died at Melrose, Mass.

The death of Mr. Kenneth L. Aitken is reported, in California. Mr. Aitken was manager of the Toronto Hydro-electric System in its early days.

Mr. F. R. Beckwith, superintendent of the electric light plant at Bridgetown, N. S., died recently as a result of injuries sustained by falling from a pole

The death occurred in Cleveland recently of Mr. Ralph B. Hamilton, vice-president and production manager of the National Safe Company, Cleveland. Mr. Hamilton was well known in Canada where for a number of years he was manager for the Packard Electric Company, St. Catharines, Ontario. He was born in Toledo, Ohio, forty-four years ago, and was a graduate of Cornell University.

The Contractor-Dealer

Goodwin is Coming

One of the items on the program of the Municipal Electrical Engineers' Association is an address by Mr. W. L. Goodwin. Mr. Goodwin's visit to Toronto is being taken advantage of by the electrical fraternity to arrange a monster banquet Friday evening, January 16. Every electrical man in and around Toronto is not only invited but is expected to boost the event. The banquet will be held at the King Edward Hotel.

The electrical organizations behind this effort are the Municipal Electrical Engineers' Association, the Electrical Contractors' and Dealers' Association, the Electrical Jobbers' Association, the Electrical Manufacturers' Association, the American Institute of Electrical Engineers and the Canadian Electrical Association, and a committee has been formed, composed of representatives of these various groups. It is the aim and the hope of this committee to get together at this banquet the largest attendance of electrical men that have ever met in Toronto. To this end a special effort will also be made to accommodate guests from out of town, as a number of men in Hamilton, St. Catharines, London and other cities and towns have expressed a desire to hear the "Apostle of Co-operation."

The committee is getting to work immediately after Christmas and sub-committees will be formed to take care of the distribution and sale of tickets. It is hoped, however, that every electrical man in the city will interest himself in this matter and send in names that might otherwise be overlooked by the regular committees.

Now then for a "long pull and a pull all together." Let us show the "Apostle of Co-operation" that we already understand the rudiments of his teaching.

A Push-the-Button Window

One morning recently pedestrians on one of Pasadena's principal streets were mystified at seeing arrows painted on the sidewalk for several blocks with the legend "Push the Button." The arrows all pointed the same way and led to the store of the H. L. Miller Company. There you met other arrows pointing from the opposite direction and knew that you had arrived.

On the window were more arrows, all pointing toward a button in the centre and inviting you to push. You, or some one else who had followed the arrows, eventually "pushed."

Then the fun began. The washing mahine started to wash, the vacum cleaner puffed out its chest, the sewing machine took some stitches, the Cozy-Glow radiator threw out heat, the electric fan began to blow, an electric siren let out a howl, a searchlight stared you in the face, and a row of lamps beamed with light. All in all you could not fail to be impressed with the things electrictiy could do at the pressing of a button.

It took a little ingenuity to arrange this window and connect it up. Of course, a push button would not carry all the current required to run the things in the window. There was a switch behind the washing machine that actually closed the circuit. This switch was closed by tension on a wire which ran up the back of the window and down the front in back of the large sign. Pressing the button pulled this wire, closed the switch and started things going.

During the time this display was in use there was a crowd constantly gathered before the store, and appliance sales jumped materially. The H. L. Miller Company have built up a big business through the proper use of their show windows and have quite a reputation in the Southwest for attractive window displays. They have proved beyond question that their windows are their best advertising medium.

Improve Your Store Methods

Resolve, with the New Year, to improve your store methods. You may be proud of them already, but there is always room for improvement. Is your store always spick and span? Are your appliances free of dust? Do you keep the glass on your showcases spotless, fresh papers on the shelves, etc.? Are the price tags getting dirty? Are you satisfied with the arrangement of your merchandise? Do you keep moving it around so it will not look monotonous to the regular customer ? How about yourself, are you always courteous and gentlemanly ? Do you try to make yourself a better salesman by studying the causes of your daily failures to sell ? How about our window, is it always tidy and clean ? Do you change it every week ? Do you use attractive window cards ?

We all flatter ourselves we are better than our competitors; yet it is a wise retailer who occasionally takes a look around to see what the other fellow is doing. Step in and have a chat with him. If you can't learn anything from him, teach him something. And particularly, don't look with disfavor on any electrical store. Your competitor is the dealer in other lines—hardware, drugs and what not. But every good electrical store creates more business for you than it takes from you.

Take Advantage of "Spade" Work

Just because the holiday rush is over, there is no excuse for the contractor-dealer slackening his efforts. The early weeks of the New Year is the time to take advantage of all the "spade" work that was done at Christmas time. Of course many a household bought at that time, all they could afford, but there are many others, however, where the decision to buy was not quite reached. Many of these people are very favorably disposed and must not be allowed to lose interest. They should be followed up systematically and convinced that electrical appliances are as good a buy in January or February as in December.

How I do my Housework Electrically

That a satisfied customer is the best advertisement is a recognized axiom in the retail business. And yet it is a very common occurrence to see a retailer ignoring this fact. Especially is this so of the contractor-dealer. In his case it is the housewife—not the man of the house—who appreciates the value of the appliance he sells. It follows then that it is the housewife whose services should be enlisted. This enlistment might take the form of regular saleswomen, women ad. writers, testimonials from women, and so on, all with the idea of expressing the advantages of electrical appliances in a women's language and in the way women think. Following this same idea, an article written by a housewife who has actually experienced the advantages and savings of these appliances will often hit the nail on the head a little more effectively than an article on the same subject by a mere man—the latter is simply theorizing, the former is speaking out of her own personal experience. For example here is an article written by a woman in the Electrical Contractor-Dealer, of New York. It expresses the viewpoint of the average head of a U. S. household. The article is entitled:

How I Do My Housework Electrically

Women long ago realized that running a household was an art. Later they were taught to consider it a science—witness the schools of domestic science—and now it is coming home to them that it is more than either art or science —it is a business, and the thinking class is looking about for ways and means to increase efficiency and decrease labor in every activity.

Women are hearing on all sides the talk of systems in business—of labor saving devices in offices—how the dictaphone, for instance, reduces the number of stenographers and increases the amount of better work each typist can turn out with less strain; how the multigraph and all counting machines accomplish the same result and with positive accuracy as an added feature.

The woman in business has this proved to her every day, be she a clerk where the use of these devices, pneumatic cash tubes, etc., aid her in her work, or be she the confidential secretary of the president of a metropolitan bank.

Were I able to give recent statistics in this article I could show how surprisingly greater the number of women in the business world is to-day than formerly. Perhaps two thirds of these women are housekeepers. If not actually in full charge of their own establishments, they have a hand in the running of them. Perhaps they are daughters who are anxious to save mothers work and worry, and pretty generally these women are on the lookout for things that will make for economy of energy, money and time.

The Women of the Home

Then there is the class of women, bless them! that do not have to consider aught but the home, its management, or maybe the actual manual effort that goes for the comfort and health of husband and children. These women seldom have time to think how their own labor can be lightened, and thereby give them time from real drudgery that might be more profitably devoted to caring for their own health, or time for more amusement with their families. This every working house-wife is entitled to and seldom gets.

There is one general and positive medium of labor saving in the home which is not being properly brought to the attention of hundreds of thousands of home makers and workers—Electricity.

Electrically operated devices which can be handled by even children, sometimes on first sight appal the woman whose mother and grandmother did this or that in a certain manner, and whose traditions have taught her that it would be almost sin to do it differently.

Comfort and Economy

How many women are there who really know the uses and economy of an electric grill ? How many know the comfort of an electric iron in the heat of the long summer days and large washings? How many business girls realize the ease with which they can begin ironing almost instantly in their own rooms, the little collars, handkerchiefs, and press the waists, etc., which they vainly have been striving to find time to get into the kitchen to do since the Sunday previous when they were washed

Again the overworked housemother whose only time for mending or making the clothes of her family is at night by a dim, high up light. She naturally worries about the size of her light bill—who does not worry about the cost of everything in these days of mountain high expense?—yet she has failed to learn that with a floor lamp, with one bulb of the most modern type, she will soon save the cost of the lamp itself on her bill by shutting off the three or four old bulbs she has been using in the ceiling chandelier. Or by this same one lamp she can do much more than mend and with little more effort.

Does she know she can run her sewing machine with the little motor which goes on the same socket? This brings up the introduction of the various kinds of wall plugs. She has not known either of the simple conveniences —labor and time savers of the sick room and for the well, strong baby—the immersion heater—the warming pads, and the portable heater which quickly warms the cold room night or day.

There is still another classification—the professional woman who keeps house, and while not exactly in store or office all day, her time is never long enough. To this growing number I belong and therefore can speak from experience when I say "acquired knowledge."

Now I wish to show how I have benefited by my acquired knowledge of electrical appliances.

My family is small and we have about the usual social duties to maintain. Before the war and shortage of domestic help I occupied the same six room apartment in which I still live. My writing then took up a certain number of hours, but at that time I employed a general housemaid who was never idle during the entire week. I also had a laundress for one day.

It seems almost incredible that I now devote much more time to my desk—have dispensed with the laundress, and by having a woman in only for two days I am more free in mind and body than with the resident maid. This is readily understandable after one is conversant with the vacuum cleaner, the washing machine, the dish washer, and the smaller conveniences we are using, which materially lighten the housework and thereby lengthen the hours for my other work.

With the best of help such as I was one time fortunate enough to have, I was obliged to oversee certain things. Latterly my two-days-a-week person is made dependable and thoroughly competent by our modernity—she cannot go wrong—the machines won't let her. She herself is enthusiastic and I fancy likes my way of playing at work better than that of my neighbor who still clings to the hand wringer and the broom and dust pan method. So you see I am care free to finish my own task, and because of not being interrupted I am fresh enough to do the cooking electrically and everything necessary that is not taken over by the helper.

If such an actual experience could be told to the thousands who are uninformed—how one woman employed for only two days is doing the work formerly done in eight—would it not tend to increase sales for the dealer in electrical appliances?

The electrical storekeeper, in trying to make a sale, frequently neglects to dispel the disquiet aroused by the thought of larger electric bills. The average woman thinks the appliances displayed in the light and power company show rooms are sold by the companies merely to increase their service charges, and while she "would love to have one even for a present," she is afraid of the monthly draft on her household allowances as a result.

The retail electrical man is in a far better position than he assumes, to fully explain to her the advantages she will derive. She knows that he has no current to sell and in many instances his price, if she only knew it, is a trifle under that asked by other stores, even on their thirty day sales. The electrical retailer often forgets to tell her that the manufacturer stands back of the device in case of a possible defect or breakage. The other stores never forget this. Many times it would be easy for the dealer to go directly to her home and demonstrate in her own surroundings how easy it is to operate the appliance.

The practical electrician as a salesman can so much more convincingly tell the desirable points and explain away the seeming complexities of a contrivance, than the sales girl in a department store. Why doesn't he do it?

Be Inspired by Electricity

The electrical dealer ought to find the means of instantly interesting either a new or old customer as readily as his appliances demonstrate their power to do their work. The unseen power under his control should be an inspiration to him. A thought should spark like the flash light, not tremble and weakly flame up, perhaps to go out with the prospective purchaser, like the old sulphur match in a fair wind.

It is granted that the legitimate electrical dealer earnestly wants to reach his public, but from the viewpoint of a woman in the buying field he has not put enough thought into selling the woman individually. Make her know why she needs his merchandise—make her see how it will help her. One woman convinced is big, unpaid-for advertising. She never conceals an acquisition from her friends.

There would be a phenomenal sales increase if the electrical retailer would make known explicitly the uses of electricity. He is the only one that the housewife can have absolute faith in, for she recognizes the fact that he must "know all about electricity."

Do Good Business With Six Items

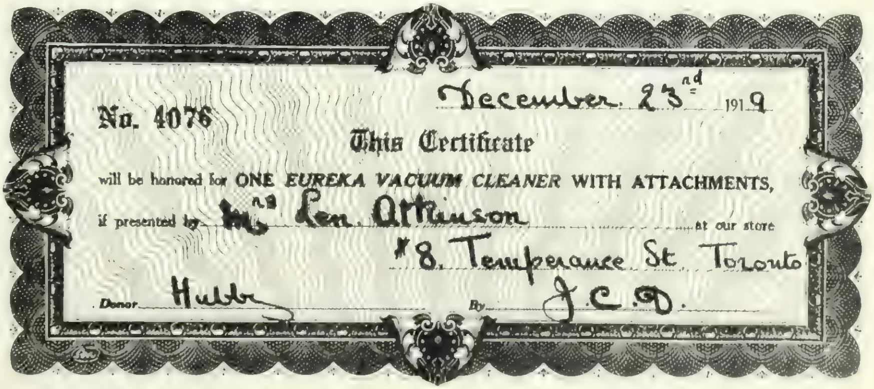
A contractor-dealer recently stated that he could take his six best sellers and carry on business without any loss in revenue. He would lose a little, he said, by not having certain things in stock, rarely called for, but he would make this up by his extra concentration on the half dozen items.

This statement might be something of an exaggeration, but there is little doubt that many a dealer carries too large a variety of stock—generally without knowing it. The trouble comes from not having accurate information on the relative activity of the various items. It is taken for granted that all the stock is moving at about the same rate, when, as a matter of fact, only about fifteen or twenty items are having a 6 or 7 turn over.

It is said the average contractor-dealer is handicapped for want of capital. Let him look carefully to see if he cannot reduce the number of lines he carries and in that way reduce both his capital expenditure and his overhead.

A Good Idea in Placing Gifts

The idea that there is nothing like **electrical** Christmas presents was utilized to the limit during the holiday campaign just passed, by the Onward Manufacturing Company, Kitchener, Mr. Witzel, Canadian manager. Mr. Witzel made use of the certificate shown herewith by means of which it was possible for the donor to make his purchase at one of the "Onward" stores and take his receipt in the form of a certificate. The presentation simply consists then in the transfer of this certificate to the fortunate person for whom the purchase was made, who demands delivery at her convenience. This is a great time saver for all parties and has the added advantage that the recipient may make her own selection—a very considerable item in these days of high costs when we all hesitate to purchase anything that may not prove useful as well as interesting.



December 23rd 1919

No. 4076

This Certificate

will be honored for ONE *EUREKA VACUUM CLEANER* WITH ATTACHMENTS,

if presented by Mrs Len. Atkinson at our store

#8. Temperance St Toronto

Donor Hubby

By J.C.D.

Certificate form used last Christmas by the Onward Manufacturing Co.

The New Era of Industrial Lighting

By Mr. E. DuB. Stryker*

At the start we want to remember that the phrase, "A new era in industrial lighting," is not merely a campaign slogan to boost lighting. It is a well established movement that the manufacturers or the dealers or anybody else can start if they try to. It is the culmination of the series of movements that have been going on for a period of years and they have come to a head at this time. Perhaps the biggest force to bring matters to a head were the conditions that existed during the war, when it was so essential that production be kept at a maximum. That was the thing that boosted industrial lighting more than any other one thing.

If we go back just a few years we will remember that there has arisen into prominence a profession which has been called illuminating engineering. These men have always had the reputation of being high brows, and most of them were, but they have rendered a great service to everybody in the electrical industry—and the people who have to use light, for this reason—they have distinguished between light as raw material and illumination, which is light properly put to use. They have introduced units of measurement for light. They have done the pioneer work in the game.

When they introduced the foot candle and the lumen they gave us a lot of technical definitions for them that nobody could understand unless they studied over them a good while, and we were not familiar with them and fought against them. But that is the same situation exactly that occurred when somebody introduced the degree Fahrenheit, and I will admit now that I can not define it accurately here, and I do not believe there is anybody in the room that can define a degree Fahrenheit. At the same time we know there is such a thing, and we all know we want sixty-eight or seventy degrees of temperature in the room to be comfortable; and we can liken that to the foot candle. We can tell a man he should have five, eight or ten foot candles to have his room illuminated. It is very similar. These definitions and these technical terms are gradually becoming popular terms.

Learning to Talk It

The State of Ohio among other states has recently started the formation of an industrial code. In fact, the code has already been written and is temporarily in force. It will probably go into full effect at the end of the next two or three months.

In connection with the legal work on the code, they held a number of hearings around the State of Ohio, and these meetings were attended by plant executives who were of course vitally interested in the subject, and they were also attended by factory foremen and workmen. These men were brought in by the executives and the managers in order to put the thing on a solid basis.

After the first two or three meetings when these workmen began to get acquainted, they could talk as clearly of foot candles and lumens as the illuminating engineer. All they required was to have somebody tell them roughly what it was, and they got the idea and talked about it; and in that way, through the formation of these state codes, through trade paper articles, through advertising that has been done not only by the manufacturers, but also such bodies as the Illuminating Engineering Society, people are gradually becoming familiar with the terms connected with illumination, with foot candle and lumen.

We have had recently a large manufacturer send a special messenger into Cleveland to get a foot candle meter, because he thought he needed it right away. He found something wrong in one department, and he knew it was the light. I do not know whether he eventually found out that it was the lighting or not, but at any rate he considered it important enough to send a special messenger all the way into Cleveland to get a meter.

We had a department store manager come into the engineering department out there. He wanted us to outline a sort of code for lighting his store. He wanted to know how much light he needed in the different departments. He appreciated the fact that where he had dark goods on display he needed more light than were white goods, and he wanted somebody to work that out for him, and tell him how much more he needed. Just last week we had an industrial plant which wrote a letter that is very unusual, but which is significant of the trend of the times. This man wrote in and said that he wanted a system of illumination designed for a new plant. He said he wanted 1,800.00 lumens to be effective in a plant that consisted of 250,000 square feet. Those were all the specifications that he gave. Reduced to terms of footcandle that means about seven foot candles. Seven foot candles are what he is asking for, and that is about twice as much as our illuminating engineers would have recommended to him a year ago, which is pretty significant of the way things are moving—much more rapidly than anybody realizes.

More Intensity More Production

Speaking of the effects on the country of industrial lighting, you have probably heard of the series of tests that Mr. Durgin ran out in Chicago, where he found that by increasing the intensity in these plants he can increase production. If I remember rightly it was an increase of eight to thirty per cent. in the payroll.

He went into one plant where they had about one and a half foot candles. The work was the assembling of carburetors for gasoline engines. The plants he picked out had accurate cost accounting systems so that he could give his record of increased production. He went into this plant, and the executives agreed to let him run his tests there. They were to run for a period of four months; one month at the intensity he had there, and the second month they were to be raised three or four times, and the third month still higher, and the last month they were to go back for a month to the original intensity. He went in and raised it the first time to about four or five foot candles, and the production increased as he had expected. The third month he raised it again, and he got it up to about eight foot candles, and the production still increased.

Couldn't Go Back

When he came around to the fourth month and he was going to put it back to one and a half the man said: "I am very sorry to have to go back on my word, but it is very important that we have to get this production, and I am afraid that you cannot put it back to one and a half, as it will slow up our production and we have promised delivery of our stuff." He had been thoroughly sold by experience of the value of lighting.

The foot candle meter is a very simple and compact little instrument. It is sufficiently accurate for all practical work. You can put it anywhere, on the bed of a machine or anywhere else, and find just exactly what the illumination is at the work. This is the first thing that has come along that will give the ordinary man a concrete idea of the fact not only that light can be measured, but an idea of what light is.

---

* [illegible]

One of the first of these was put into a department store one day to check up an installation that had been put in there; and when the manager of the store saw it and had it explained to him and found out what it could do he put in an order to buy one.

The work that Durgin did in Chicago is of course for the higher intensities, what he has termed "productive intensities." When we begin to get ten foot candles of light in a plant we begin to run into a lot of little conditions that we have to look out for.

In an automobile plant you have probably heard the phrase "vertical illumination" used, and it probably does not mean a great deal to you concretely. You may have read explanations of it and read papers on the subject, but it did not get across to you the way it should. Now, there is no reason why those things should be so technical, and there is no reason why they should not get across. Vertical illumination is a very simple thing, and the way to realize that is to try this little experiment.

What is Vertical Illumination.

I have a work bench home in my cellar, and I like to tinker around in the evenings and make things, and being at Nela Park I decided I would have some really good light about it. I got one of the best reflectors I could find, and a bowl frosted lamp and swung it right over the middle of the work bench, and I had a very high intensity of illumination. One of the first things I wanted to do was to saw off a board and make it square; so I laid it down on the table and put the square on it, and ruled it off, and I brought it over to the edge of the bench and put it in the vise; when I wanted to saw on down the line I could not find the line, because the surface instead of being horizontal was vertical, and there was no illumination on the vertical surface. The light came from that side instead of this side, and there was no vertical illumination. That is all there is to vertical illumination.

In the office and the drafting room you do not need vertical illumination. All you are interested in is one flat or slightly oblique plane that the paper is on. In the ordinary room the desk is perfectly flat. In the arts and the industries you are very much interested in it, because that is one of the things that helps you to see bodies in the three dimensions.

Too Much Glare

Then there is still a more important thing, and that is the question of glare. You all have heard of glare, and nobody has yet given us a very good definition of it, but everybody has his own idea of what it is. When you look at something and the light is too bright and it hurts, that is glare. You may have heard of people going out and looking at a lighting installation and they will go into a room and say: "There is entirely too much light here." It is not too much light; it is too much glare.

We could not put in an installation with our ordinary industrial units or commercial units that would give us too much light; but it is very easy to do it where we get too much glare, and that is what kills it. In ordinary daylight, when you are out on the street, you will have several hundred foot candles intensity, and in direct sunlight you will get into several thousands; but unless it is very bright sunlight and the sun is at such an angle that you get it right square in the eye it does not bother you very much; and yet you go into a room where there are only five or six foot candles, and you will feel that there is entirely too much light there. It is not the light; it is the glare.

There is another kind of glare that is called indirect glare, or specular reflection. That is what enhances the value of diamonds.

Another thing the illuminating engineers have accomplished for us is to standardize systems of lighting. They have made very definite recommendations so that the man that goes into the lighting game to-day can procure in tabulated form practically all of the information he needs. He can go to a table and find just what he ought to do. He can find how far back he ought to space certain units, and how high he ought to hang them off the floor, and he can find out what size lamps he ought to use to get a certain intensity of light down here.

The Standard Reflector

The biggest step in that direction is the development of the L. R. M. standard reflector. It is put up by the principal reflector manufacturers, and the design has been agreed to by the illuminating engineers of the reflector manufacturers and the principal lamp manufacturers. It is a sort of cross between the old bowl and the old dome. It combines the advantages of the two, and eliminates the disadvantages. The angle of cutoff is about halfway between the old bowl and the old dome, but it gives a larger area for reflection and better protection for the eye.

One of the new lamps that has just been put out is a bowl enameled lamp. It is a lamp that will take the place of the frosted lamp, and we hope the greater part of the clear lamps. The enamel is applied externally, and is put on so that it will not come off when washed. It is not soluble in anything that we have been able to find as yet. You can wash it and keep it clean. It is not like the frosted lamp that is washed and is still dirty. It is very much more desirable from the standpoint of the lighting, because it is much denser than the frosting.

There is not any bright spot in the bowl of that lamp at all. It is uniform all the way across. That combination of the L. R. M. reflector and the bowl candle lamp should answer the requirements of eighty-five per cent. of industrial plants.

Executives Sold an Idea

There has been completed recently for the National Lamp Works a very large survey of present conditions in industrial lighting. Some of the results that have come in from them have been startling.

They went into more than five hundred plants between the Mississippi and the Atlantic, and between Masachusetts and Florida. In eighty-five per cent of the plants they visited they have found that the executives—and they call on the executives—were thoroughly sold on the value of good lighting. They had read paid advertising and trade paper articles, and they knew all the advantages, and they would take them out in the plant and show them what a fine installation it was.

These men had previously been educated for about a week out at Nela Park as to what was good lighting and what was not, and on the basis of their judgment there was a little over forty per cent. of these plants that had fair lighting under the old standards. The executives were thoroughly solid on the proposition of good lighting, but they did not know what good lighting was. They were perfectly sincere in thinking their lighting was good, but they needed somebody to show them.

Another interesting thing developed: Seventy-two per cent. of those plants went to their local people, the contractors and dealers, for advice on lighting. Something like three or four per cent. went to the lamp manufacturers and about eight per cent. went to the central stations. The rest of them used their own electricians.

That places the responsibility for industrial lighting directly upon the contractor-dealer. They are the people to whom the plants go. They go to the contractor-dealer for the greater part of their lighting. The part that the manufacturer takes care of is negligible in the total amount and it is up to the contractors and dealers to take care of them properly. It is to everybody's advantage to do it.

The principal thing in selling this high intensity productive lighting is to be sold on it yourself, and about the only way to be sold on it is to see it. It was in a plant in Cleveland about two weeks ago where they had an ordinary lighting installation. They had a unit of light for each machine. The lamps were dirty, and in some places the reflectors were missing altogether and in some places they had been broken, and one thing and another wrong, and they had about between one-tenth and two-tenths of foot candle intensity that they were working under.

They wanted to have the place brought up to date, so they put in a system that gave ten foot candles. When you went into the room where they had that system you could actually feel the stimulation that the light gave you. It just put you on your toes and gave you pep; and that is the effect it has on the workmen. If you ever see a plant where they have one of these installations, by all means go and see it, because you cannot fail to feel the effect of the light; it just gets hold of you.

Get Acquainted With Good Light

At the National Electric Light Association Convention down at Atlantic City a lamp committee put on an exhibit down there. The industrial lighting part of it consisted of a room with three separate systems; they showed poor lighting, fair lighting and good lighting. And central station men from all over the country down there went in and marveled at that good lighting. There was not anything about it to wonder at; it was not even productive intensity lighting. It was what would ordinarily be termed good lighting. The point was that they had never seen a really good lighting installation, and when they did see one they were thoroughly sold on it.

Long Profits and Fat Ones

By Mr. Sydney Neu

Which would you rather make—forty per cent. or ten thousand dollars?

Forty per cent. is a rather long profit. Ten thousand dollars is a fat profit. Nine out of ten electrical merchants, now at the merchandising game, are often hypnotized by the length of a profit and do not stop to figure up its probable fatness. The experienced merchant pays little attention to the discount but figures up his probable gain. Many a man has become a millionaire on one per cent.

For example, if some bright salesman should offer you some electric irons at "forty off" the proposition would look good at first glance. At $6.50 list, you would be making $2.60 on each iron instead of say, $2.28. "Send me a gross."

But wait—It is going to be hard to sell these irons. They do not look quite as good as the standard irons. Maybe I can sell only two dozen of these with a gross profit of $67.20 in the same time it would take to sell three dozen of the others, with a gross profit of $77.40. There will undoubtedly be more repairs which will cost me time and money, too. So on second thought you had better not send them. Of course the clever salesman will tell you his long-profit iron is just as good, that his firm does not advertise and gives you the benefit of the advertising expense.

Don't Let That Fool You

National advertising is **not** paid for by the dealer on the consumer. It is paid for out of the reduction in selling expense, and the savings of quantity production. A concern making 150,000 irons a year can certainly build and sell irons 20 cents apiece cheaper than the concern making 5,000. And 20 cents apiece, saved, will pay for $30,000 worth of advertising to maintain the big production.

Not alone that, but the advertising is the surest possible guarantee of quality, because no manufacturer can advertise continuously an inferior product. Advertising acts as a deadly poison to the four-flusher.

There is only one excuse for an exceptionally long profit—cheapness. Don't let them tell you different. And for this season a long profit is generally also "skinny."

Co-operative Campaign Brings Out Advantages of Good Window Lighting

The industrial department of the Rochester (N.Y.) Railway & Light Co. is conducting an organized campaign for better show window lighting among the merchants of Rochester, explained in the Electrical Review. A survey showed that approximately 80 per cent. of the window displays in the city were poorly lighted. In order to spread the idea of good lighting the central-station company, in co-operation with the Rochester Electrical Contractors and Dealers Association, decided upon definite plans under which to work.

A list of merchants having poorly lighted window displays was compiled, and circular letters were sent to all on the list inviting them to call and inspect some examples of modern show window lighting prepared by the Rochester Railway & Light Co. These consisted of exhibits of colored fabrics, loaned by one of the department stores, one exhibit being correctly illuminated with modern methods and the other incorrectly illuminated by old methods. At the same time advertisements in the daily papers were used to interest the prospects and other merchants who were not on the list.

Salesmen used arguments to the effect that store managers were slow to realize that $15 a month spent for electricity in maintaining good lighting in their window space meant an increase from 50 to 200 per cent. in their sales; also that the public was becoming familiar with well lighted window displays and that merchants should not neglect the opportunity of showing their goods to the best advantage.

There should be no need for bargain sales in the electrical business. However, the careful contractor-dealer will take an early inventory of his stock following the holiday trade and find out what there is on his shelves that has not been selling readily. These items should be given special attention and got rid of as soon as possible. It may be that in such a case reductions in price are justified; the dealer may look on his lost profit as the cost of his experiences. Next year his stock will be chosen more in keeping with the public demand. Too many stores have heavy stocks of slow-moving lines. This eats away the profits on the active lines. Keep your stock moving. For example, Mr. Geo. E. B. Grinyer, of Guelph, Ont., says he turns his stock 6 or 7 times a year. That means intelligent buying as well as energetic selling.

The Canadian General Electric Company maintain a very attractive pair of windows at their showrooms, King St. West, Toronto. Note the well balanced layout in the accompanying photograph. The two house plants in the background add to the "homey" appearance. This company employ an expert in store and window arrangement, whose services are always at the disposal of any contractor-dealer who may need advice.

Canadian Hart Accumulator Co. Expanding

The Canadian Hart Accumulator Co. Ltd., manufacturers of storage batteries, have found it necessary, due to the large increase in their business since placing an improved auto type battery on the market, and further developing their cells for use in farm lighting, to extend the company's works at St. John's, Que., by an addition which will double the present plant capacity. This company was formed some four years ago for the purpose of looking after the Canadian interests of the business carried on by the Hart Accumulator Co. of Stratford, England, which business at that time consisted mainly of manufacturing cells for train lighting, central stations, wireless and other stationary purposes. Very recently, in order that urgent matters might be more promptly dealt with as they arise, the company was reorganized and a Canadian directorate placed in full charge.

The Canadian public, for obvious reasons, has during the past year, shown a decided tendency towards the purchasing of Canadian-made articles, not the least important of which are storage batteries. With the advantage of the parent company's experience of over thirty years in manufacture of storage batteries, the demand for the Hart battery has become so great that expansion has been fonud necessary in order to take care of this demand. The company expects to have the addition completed and the works in full operation and running to capacity by the end of January, 1920, which, they state, will be none too soon in view of the orders in hand for spring delivery and the auto battery business which promises for the forthcoming motoring season.

The city of Winnipeg have awarded the following contracts in connection with the extension to their Point du Bois power plant: steel strand cable, Canada Wire & Cable Company; insulators, Canadian Porcelain Company; structural steel for power house extension, Dominion Bridge Company; aluminum cable, Northern Aluminum Company.

A Twin Dry Battery

The Twin Dry Cell Battery Company, of Cleveland, are invading the Canadian field and have placed distribution of their product in the hands of Mr. Frank T. Groome. The "Twin" is a new type of dry-cell, designed for continuous or heavy duty service. It is claimed to have greater efficiency due to its construction and to a much larger zinc surface being used than in the ordinary cell. In its construction there are three connecting posts, a carbon at the centre of the battery and two zincs, one on either side. The battery may be used to give full strength by connecting both zincs with the carbon, or, if desired, either half of the battery may be used, keeping the other half in reserve. The size of the standard "Twin" dry-cell is 3½ in. by 2 in. by 6½ in. high.

Consolidation of Heating Departments

On January 1st, 1920, the manufacturing departments of heating devices of the Canadian General Electric Co. Limited, the Canadian Hotpoint Electric Heating Co. Limited and the Hughes Electric Heating Company, all of Toronto, Ontaroi, are being consolidated to form a new company, known as the Canadian Edison Appliance Co. Limited. This new Canadian enterprise will continue to manufacture the complete line of heating and cooking devices that have been manufactured in the past by the above named companies. The new company states that its purpose is to sell all the complete lines, and carry on the policies of the above companies, in the broadest possible manner. Mr. J. R. Richardson is the managing director; Mr. F. M. Dusenbury, sales manager; Mr. F. R. Goldsmith, works manager; Mr. R. S. Morgan, secretary and treasurer and Mr. W. P. Young, purchasing agent, all of Toronto, Ontario.

Early in 1920 the Canadian Edison Appliance Co. Limited will open up their new works in Stratford, Ontario. The General Offices are situated at 25 Brant St., Toronto.

Salesmen—Attention !

Life is Service.

The one who progresses is the one who gives his fellow-beings a little more—a little better—Service.

This store is operated primarily for the benefit and convenience of its visitors and customers.

Without customers, there could be no store.

These are simple Facts, easily understood.

So then it behooves every man and woman employed here to remember this always, and to treat all visitors and customers with courtesy and careful consideration.

Any member of our force who lacks the intelligence to interpret the feeling of Good-Will that this store holds toward its visitors cannot stay here very long.

New customers are just as valuable to us as old customers—remember that; for each new customer is an old customer in the making.

See that you do your part to make him want to come back here, with his friends.

Impress upon him the fine good-fellowship of the place; the "No-trouble-to-help-you" spirit.

Never be perky, pungent or fresh—the customer pays your salary as well as mine. He is your immediate benefactor.

To add to the attractiveness of his fixture room and the saleability of his stock of domes, a dealer has constructed racks providing light sources over which the domes are placed for display. The racks, as described in Electrical Merchandising, are built of heavy pine boards, painted to harmonize with the fixture-room decorations, and the sloping shelves are covered with velvet of the same color. At 3-ft. intervals, circular openings are cut in the inclined shelves, and beneath each opening is a reflector containing a 60-watt lamp. A wooden peg just above each opening insures that the dome will be centered in position. A raised ledge along the edge of the shelf also insures that the domes will not slide off to the floor if improperly placed over the openings. This dealer finds that glass domes when lighted sell much more quickly than when exhibited "dark," and declares that his inclined exhibit stand has been a means of increasing his sales of these fixtures.

Ewart, Jacob and Byam

The firm of Ewart & Jacob, well known consulting engineers, Toronto, has been re-organized under the name, Ewart, Jacob & Byam, Limited, engineers and architects. In the person of Mr. Byam, this firm have added to their personnel a structural engineer of recognized ability. By a close alliance with the well-known firm of architects, Shepard and Calvin, they will also be able to provide the best architectural talent and practice.

This firm now, undoubtedly, represent a very strong combination, as they include in their personnel all the elements necessary to give an absolutely complete serivce for any and all kinds of industrial work. They claim, in their announcement, to be in a position to do better team work than any other strictly Canadian organization and equal to the best that can be obtained from any source. If the exceletn work of the old firm of Ewart & Jacob may be taken as a criterion, this claim for the new firm is well founded

Mr. F. R. Ewart is president of the new firm and Mr. J. C. Armer vice-president. In addition to Mr. Jacob and Mr. Byam, there is also associated with the firm, in addition to the architects, Shepard & Calvin, mentioned above, Mr. C. E. Armer and Mr. H. M. Cox. Mr. J. C. Armer, the vice-president, will devote himself entirely to the business side of the activities of the firm.

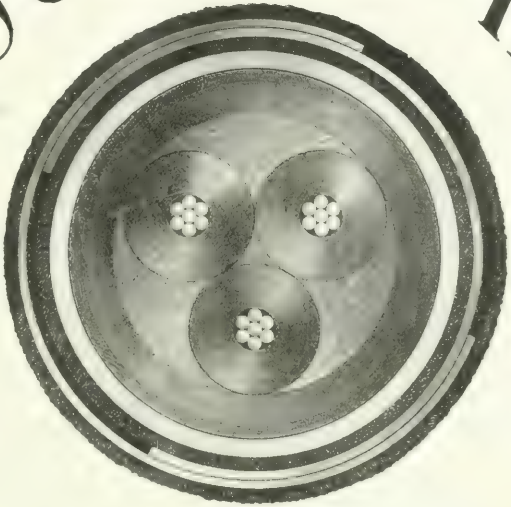
The new firm have issued an attractive booklet, outlining their past record and explaining in some detail the aims and ideals of the new organization.

The Ontario Railway and Municipal Board have approved two by-laws submitted by the city of Toronto covering the issuing of debentures to the amount of $491,000 for hydro extensions.

Mr. George J Haid, electrical contractor and dealer in all kinds of electrical appliances on Wellington St., Preston, Ont., is a believer in having his windows on his sales staff. He realizes that a good window display sets people thinking and educates them in the value of electrical devices. It also brings them back to his store when they think of buying. The photograph shown here is one of the most attractive we have seen

PHILLIPS'

ARMOURED CABLES



No. 2 B. & S. 3-Conductor 25,000 Volt Cable

Paper Insulated, Lead-covered, Double Steel Tape Armoured

Supplied to the Order of
The Quebec Railway, Light, Heat and Power Company

Eugene F. Phillips Electrical Works, Limited
MONTREAL

Branches : Toronto, Winnipeg, Regina, Calgary, Vancouver

Current News and Notes

Chatham, Ont.

The Chatham Public Utilities Commission has decided to enlarge the local Hydro sub-station to take care of the extra equipment necessary for the handling of increased business due to the acquisition of the electrical services of the Chatham Gas Company.

Cornwall, Ont.

The ratepayers of the town of Cornwall, Ont., defeated a by-law to extend the franchise of the Stormont Electric Light and Power Company for a further ten years.

Darlington, Ont.

The ratepayers of Darlington township have passed the hydro radial by-law.

Didsbury, Alta.

A proposal to dispose of the present plant and purchase power for the town from the Olds Electric Company, Olds, Alta., has been defeated by the ratepayers of Disdbury, Alta.

Galt. Ont.

~~Owing to~~ the present shortage of Hydro power sign lighting has been prohibited in Galt until further notice.

Grand'Mere, Que.

The town of Grand'Mere, Que., will call for tenders on a quantity of electric meters.

Halifax, N. S.

Fire in the warehouse of the Maritime Telephone and Telegraph Company, Halifax, N. S., caused damage estimated at $150,000.

Havelock, Ont.

The Hydro-electric Power Commission of Ontario contemplate the reconstruction of the Hydro system at Havelock, Ont. A number of electric meters are also required.

Kincardine, Ont.

The ratepayers of Kincardine, Ont., will vote on a by-law authorizing the remodelling of the town's electric lighting plant at a cost of $40,000.

Lumsden, Sask.

The town of Lumsden, Sask., has asked for government legislation that will enable them to secure electric light and power from Regina.

Montreal, Que.

The Bell Electric Company, Verdun, Montreal, have registered.

Mount Albert, Ont.

The ratepayers of the village of Mount Albert, Ont., will vote on a hydro enabling by-law.

New Liskeard, Ont.

Our report in December 1 issue that a hydro-electric power development was proposed at Indian Chutes on the Montreal River has been verified by Sutcliffe and Neelands, engineers, of New Liskeard. English capital has become interested in this power site which is capable of a total development of 5,000 h.p. At the present time the final surveys are being made, including the location of a transmission line to the Machewan gold mining district and the Gowganda silver area. Construction will be started early next spring, provided the mines are ready to enter into arrangements for power. Sutcliffe and Neelands are the engineers in charge of this work but state that they will not be ready to call for bids for several months yet.

Ormstown, Que.

Negotiations are under way with the Montreal Light, Heat and Power Consolidated to extend their line to Ormstown, Que.

Sarnia, Ont.

It is stated that the city of Sarnia will shortly commence negotiations with a view to purchasing the now privately owned Sarnia street railway system.

Smiths Falls, Ont.

Partnership has been dissolved in the firm. of Alex Baker & Company, electrical contractors, Smith Falls, Ont., and the business is continuing under the name of Alex. M. Baker.

St. Catharines, Ont.

Fire recently destroyed the factory of the Dominion Electric Company on Church Street, St. Catharines, Ont. The loss is placed at $15,000.

St. John, N. B.

The New Brunswick Telephone Company, Limited, have filed an application with the provincial government for increased telephone rates in the province—the first general increase since 1911. It is estimated that an additional annual revenue of $264,000 is required.

St. Thomas, Ont.

The city council of St. Thomas, Ont., received tenders until December 30 on alternative electric and gasoline auxiliary pumping equipment.

Stouffville, Ont.

The ratepayers of Stouffville, Ont., will vote on a by-law authorizing a contract with the Metropolitan Railway Company for a supply of power from the company's plant at Bond Lake. The price per horsepower is said to be $25.50. The transmission line would also pass through, and supply, several villages on the way to Stouffville.

Squamish, B. C.

The hydro-electric power plant on the Stuwamus River, two miles from Squamish, B. C., is now in operation. The ultimate capacity of the development is placed at 3,000 h.p.

ALLEN FLUX
NON-ACID—FOR SODERING
BEST EVER

A large electric company recently said, "We find that your non-acid, non-corrosive flux is the best we have been able to get, and we will be only too glad to have you supply our needs, from time to time."

Allen Flux is put up in form of sticks, liquid, paste and salts.

Approved by N. B. F. U.
Send for free samples.

BISSETT & WEBB LIMITED
126 Lombard St., Winnipeg, Man., Can.
at it since '93

Electrical News
Generation, Transmission and Application of Electricity

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, General Manager.
W. R. CARR, Ph.D., Editor.

HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700
MONTREAL - Telephone Main 2299 - 119 Board of Trade
WINNIPEG - Tel. Garry 856 - Electric Railway Chambers
VANCOUVER - Tel. Seymour 2013 - Winch Building
NEW YORK - - - Tel. Worth 248 - - - 309 Broadway
CHICAGO - Tel. Harrison 5351 - 1413 Gt. Northern Bldg.
LONDON, ENG. - - - - - - - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, January 15, 1920 No. 2

Group Insurance Helps Both Capital and Labor

The recent amendment to the Insurance Act, which now makes group insurance possible, is being utilized by a number of electrical organizations, for there seem to be advantages on both sides. The outstanding features of the plan are, (1) the sums for which an employee may be assured range from $500 to $3,000; (2) a group must include fifty or more employees; (3) no medical examination is required; (4) the policy includes a disability clause, and (5) the rates are slightly lower than the individual could obtain.

From the employee's viewpoint this plan has many advantages. It indicates that the employer has the interests of his men at heart; it provides for the employee's dependents in case of death; it provides something for him in case of accident; it gives him an insight into the value of insurance and, in general, into the necessity of providing for a rainy day. Many a man who is up in years and also perhaps not medically fit enough to pass an examination, gets life insurance the same as young, healthy men.

The employer also benefits, though this is offset, in part at least, by the cost of the premiums. The plan will have a tendency, however, to make an employee hesitate before leaving a job along with which he sacrifices his life insurance. This attitude of mind will tend to make the employee more settled and satisfied and consequently he will do better work. This, of course, is an advantage on both sides, for statistics show that workmen lose much more than they gain by constant shifting, while at the same time it curtails production and lowers the standard of the article produced.

The labor "turnover" to-day is appalling in some of the industries. If group insurance does nothing more than reduce this one item it will probably have justified itself in the commercial world.

Electrical Papers Before the Engineering Institute

Papers relating to the electrical industry will be read at the annual professional meeting of the Engineering Institute of Canada, to be held at the Windsor Hotel, on January 27th, 28th, and 29th. The annual meeting will be held at the same time.

It is intended to make the professional meeting of a national character, and to this end a program dealing with national industries and questions has been prepared. The subjects include, the water power policy, particularly relating to the work of the Quebec Streams Commission, which will be dealt with Mr. O. Lefebvre, the chief engineer of the Commission; the Textile Industry; Highway Policy, with a discussion regarding the Federal subsidy; the forests of Quebec and the pulp and paper industry; and the Quebec Public Health Act, from the view of the engineer. Invitations have been extended to the Lieut.-Governor, the Premier of the Province, and Ministers of the Crown, together with leading industrialists and engineers, who are expected to take part in the discussion.

The annual business meeting will be held on Tuesday, January the 27th, with addresses by the retiring president and the inception of the new president, Mr. R. A. Ross, the well known consulting electrical engineer, Chairman of the Lignite Utilization Board, and one of the commissioners of the City of Montreal. In the evening, there will be a reception and dance. On the following day, some of the papers will be read, which will be followed by a lunch at the works of the Northern Electric Company and an inspection of the plant; in the evening the annual banquet will be held. On Thursday, January 29th, the professional program will be continued, and in the evening a smoker will be held.

Arrangements are being made for the entertainment of ladies, a large number of whom are expected to be present.

Montreal Luncheon Hears Talk on Cement Industry

An illustrated talk on the manufacture of Portland Cement was given by Mr. H. S. VanScoyoc, the publicity manager of the Canada Cement Company, at the meeting of the Montreal Electrical Luncheon, on January 7th. Mr. VanScoyoc sketched the history of the use of cement, stating that the materials used in its manufacture were employed as far back as the Druitical age in England and the Nealithic and Palacolithic ages in France and Germany. The history of the development of Portland Cement was closely associated with that of hydraulic lime, for it was the endeavor to obtain a satisfactory hydraulic lime in the first portion of the nineteenth century that resulted in the invention of Portland Cement. Mr. VanScoyoc, in describing the process of manufacture stated that it was divided into the wet process, and the dry process. He explained the quarrying operations, and the methods of crushing, mixing and grinding the material. He also gave details of the drying process, and the methods by which the material is conveyed to the storage bins. Electricity, said the speaker, played an important part in the cement plant, large numbers of motors being used for various purposes, while in the conveying end, electric power was used to a very full extent. Under certain conditions, electrolysis affected concrete or rather the steel reinforcing in concrete, causing it to expand [illegible] and where electric power was likely to come in contact with cement, special precautions should be taken by means of using insulated material.

Petition to Issue Writ Rejected

The petition for the issue of a writ of prohibition against the Public Utilities Commission of Quebec was rejected by Judge Malouin in the Superior Court. The petition had been presented by the "Credit Municipal Canadien," which had been ordered by the Commission some few months ago to improve its light and power service supplied to the Corporation of St. Germain de Rimouski. The Credit Municipal claimed the Commission did not have the power to make the order as it had been appointed by the provincial authorities, which had acted ultra vires since they had given the commissioners powers which could only be granted by the Dominion Parliament.

In giving his judgment dismissing the application for the writ of prohibition, Judge Malouin gave the following principal reasons:

A writ of prohibition is an extraordinary proceeding to which the party has recourse only when the law does not give any appeal otherwise; and secondly, the statute establishing the Public Utilities Commission allows an appeal to the Court of King's Bench from the final decision of the Commission.

Company Must Build Bridge

The Court of King's Bench, Montreal, has sustained a judgement of the Court of King's Bench, to the effect that the Montreal & Southern Counties Railway Co. must carry out a contract with the City of Granby to build a steel bridge across the Yamaska River, at Irwin Street, Granby. The company contended that it was not bound to exercise its rights to cross the river at Irwin Street, and that the Railway Commissioners had exclusive jurisdiction to deal with the points involved. The Court held that what the city desired was a bridge and nothing was said in the contract about the bridge being built only and when the company wished to run a line over the river. As to the jurisdiction of the Court, it was conceded that a court of civil jurisdiction could not order the construction of a railway in a particular place, but where a railway company had contracted, for a valid consideration, to build a steel bridge over which vehicles and pedestrians might pass, the enforcement of that contract was held to be within the jurisdiction of the civil courts.

Bureau of Standards Issues Interesting Paper

The Department of Commerce, Bureau of Standards, Washington, are now distributing Scientific Paper No. 355, "The Determination of the Output Characteristics of Electron Tube Generators." Owing to saturation and rectification effects in three-electrode vacuum tubes, the currents which they deliver to any type of output circuit, when used as a generator, are heavily loaded with harmonics. Experimental results indicate that the frequency of the oscillating currents generated is the natural frequency of the output circuit. Hence this circuit behaves as a filter in series with the tube and the d.c. power system, and the useful output current is approximately sinusoidal, whatever the distortion of the tube currents, depending in amplitude solely upon the fundamental constituents of the tube currents. General expressions are derived for the power and current output in terms of static characteristics of the generating tube, and are corroborated by experimental results obtained with a particular tube.

Bell Company Reverting to Two-Party Lines

Owing to the scarcity of materials, and the heavy demands placed upon the Bell Telephone Company for service, it has been decided to inaugurate the two-party line service in the outlaying districts of the city of Montreal. At present this will only effect Notre Dame de Grace and the eastern sections of the city. It is the intention of the company not to interfere with the telephones now in operation in these districts, unless desired to by the subscribers. The term two-party line is associated in the minds of many people with, the constant ringing of the telephone bell, but with the central energy system now in use in Montreal, the operator can ring one subscriber without, distuurbing the other. This system is in operation in several towns, such as Guelph and Galt, and found to be very successful. The symbols W and J are to be used on the end of the telephone numbers, to distinguish the two subscribers on each party line. In cities of the United States, where the first rate basis is in use as in Montreal, sixty-five per cent. are on party lines, and thirty-five per cent. on individual lines.

Montmagny Power Corporation Making New Development at St. Raphael

Mr Maurice Rousseau, K. C., president of the Montmagny Power Corporation, recently signed a contract with "La Machine Agricole Nationale," formerly the General Car & Machinery Co., to supply 3450 horse-power for the rolling mills and shops. Work will be started immediately and development on "Riviere du Sud" at St. Raphael, about 16 miles from Montmagny. Engineers Gauvin & Lessard in Quebec, are revising plans, and contracts will be let early in January for transmission line, penstock, water wheels, generators, and concrete dam. The plant has to be in operation for the first of January 1921.

Legislation re Registration of Engineers

The Toronto section of the American Institute of Electrical Engineers held their regular monthly meeting in the Engineers' Club rooms, Friday evening, January 9. The program consisted of an open discussion on the advisability of "Legislation re Compulsory Registration of Engineers." This subject has recently been receiving considerable attention from the engineering profession in general. Two provincial draft bills have been drawn up—one by the Joint Committee of Technical Organizations and the other by the Engineering Institute of Canada (Ontario Division) and it was a discussion of these drafts that occupied the attention of the meeting.

C.P.R. Improving Block Signals

The Canadian Pacific Railway, at Montreal, is contemplating the installation, during 1920, of an electric approach line in their automatic block signals. At the present time these block signals are lighted by oil lamps, and much unnecessary labour is caused by having to light each one separately. The change to electricity will overcome this, and also the danger caused by the wind blowing out the lamps. The lights will consist of special three and one-half volt Mazda lamps, burning off separate caustic soda batteries, and will burn only when a train approaches the block.

Motor Trucks Co. Ltd., Brantford, are said to be equipping part of their factory for the manufacture of Bluebird electric washing machines in Canada, for the Bluebird Appliance Co., of St. Louis. They expect to be turning out machines in about six months.

The Theory of Constant-Power Generators

Essential for Arc Welding Where it is Necessary to Keep the Temperature Constant

By Mr. F. K. D'Alton

Theoretically, a constant power generator would be a machine having such a voltage-current characteristic that the product of terminal volts and load amperes is constant at all loads. Any change in the resistance of the load would result in an automatic change in voltage keeping this product constant. If the energy delivered be entirely transformed into heat, the rate of generation of heat would then be constant, independent of changing resistance in the load.

In Fig. 1 are shown a number of curves, each representing a constant output of the magnitude indicated. The "B" curve is the four kilowatt curve, the standard which several manufacturers are endeavoring to approach in the direct current machines they are designing for electrical arc welding. If a perfect constant power generator could be built it would have two features which, from a practical standpoint, are very undesirable,—namely, that at no load the voltage would rise to a very large and dangerous value and that on a short circuit, where the terminal voltage is zero, the current flowing would have an infinite value. The practical generator, therefore, can only be allowed to follow the constant power curve through a limited range. There must be a fixed reasonable limit to the voltage at no load, and also a finite safe limit to the short circuit current.

The applications of such a machine are few, however, in comparison with the constant potential generator. At the present time, arc welding seems to be the sole purpose for which constant power generators are used. It is desirous in this process to keep the temperature constant, which requires that the power at the arc be kept constant. Hence the use of these machines.

Probably the simplest scheme giving a voltage-current characteristic, similar to curve B for a very short range only, is the constant potential, shunt or compound wound, generator feeding current through a ballast resistance. Straight line characteristics are the result, and adjustment is usually made to give a full load characteristic as shown by the dotted line "X" in Fig. 1. Adjustments for other currents give the other characteristics "Y & X" (Fig. 1.) These indicate a limited no-load voltage of about sixty volts, and also a limited short circuit current, but have only a very short section where the power is approximately constant. This method is a simple one, but introduces the ballast resistance wherein occurs considerable loss of energy.

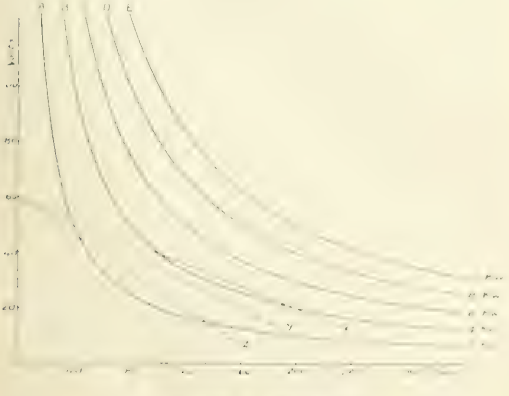


Fig. 1—Curves of Constant Power

Before studying the characteristics of the specially designed constant power generators, let it be understood that each of these machines is equipped with interpoles which perform the same function as the commutating poles of the ordinary direct current generator. As the introduction of interpoles into the diagrams and of their action into the following descriptions would only unnecessarily complicate matters, it has been thought better to omit them here, knowing that they are embodied in all of these machines but that there is nothing unusual in their action.

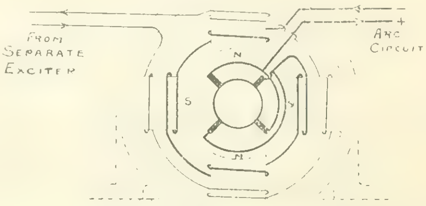


Fig. 2—Wiring of separately excited differentially compounded generator

(a) The Separately Excited-Differentially Compound Wound Generator

The first machine which eliminates the ballast resistance and at the same time has characteristics approaching the curve "B," was put on the market about fifteen years ago. This generator has a four pole frame and a normal four pole armature. Each pole contains two windings, i.e. a "shunt" winding and a series winding. This so-called shunt winding is connected to an exciter (on the generator shaft) from which the main separate excitation is obtained. It

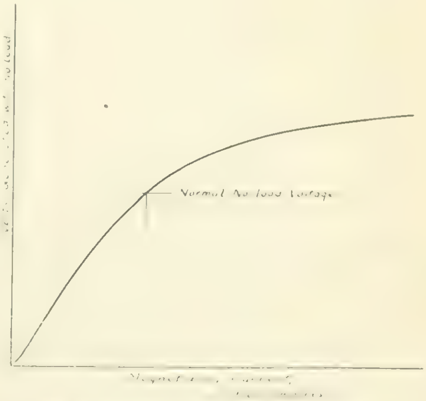


Fig. 3—Saturation curve of welding generators

is not, as usually understood, a "shunt" winding. The series winding is connected in series with the armature so as to carry the load current, and in doing so to oppose the separately excited field. Fig. 2, is a diagram of the windings of this machine.

In studying the characteristics of a generator of this type let us consider that the saturation curve at no load is as shown in Fig. 3 and that the "normal no-load voltage" is the voltage obtained with the separate constant excitation. The point on the curve at which the machine is operating is thus indicated. Now, as load increases, the terminal voltage will lower for two independent reasons—the strength of all poles is being reduced and the voltage drop in the armature is increasing with the current. The curvature of the characteristic (Fig. 4) is due to the shape of the saturation curve (Fig. 3) below the point of normal no load voltage. It will be observed that this characteristic is not as close an approach to the curve B, of Fig. 1, as that given by a constant potential generator with ballast resistance, the improvement in efficiency being the chief point gained.

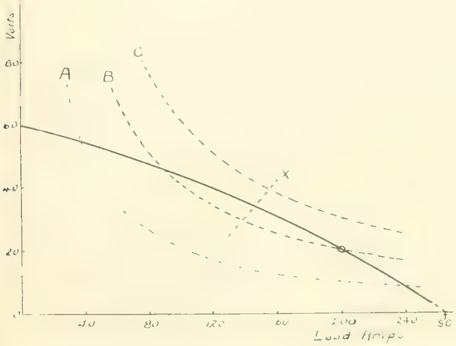


Fig. 4—Voltage-current characteristic of separately excited, differentially compounded arc welding generators

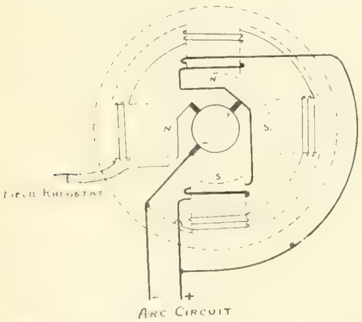


Fig 5—Wiring of self excited generator differentially compounded on half of each pole

(For purposes of comparison, some of the constant power curves are shown, dotted, in Fig. 4.) The particular characteristic curve, shown in Fig. 4 is for full load conditions only. Where it is crossed by the dotted line "X," it is practically a curve of constant power for a short range.

Adjustment may be made for other loads by varying the effectiveness of the series winding. In this machine, such adjusting is done at the control panel by altering the resistance of a shunt placed across the series coils thereby controlling the fraction of the load current which flows through this winding.

(b) The Self-Excited Generator, with Differential Series Winding

This type of direct current generator made its appearance on the market a few years ago and is a slight improvement on the machine just described. The wiring is shown in Fig. 5. The generator consists essentially of a two-pole armature assembled in a frame with four symmetrically located poles of equal cross section. Diametrically opposite poles, horizontally, contain only shunt coils, while vertically opposite poles contain series coils as well as shunt coils. These series coils have taps whereby the number of effective turns may be varied and adjusted to give the desired magneto motive force in opposition to the main excitation, which is obtained by means of the shunt coils. All four pole pieces are magnetized by these shunt coils but the polarity of adjacent poles is the same in two instances, eg. left and upper, right and lower. Hence a pair of poles with the same polarity may be considered to be one pole having two parts. Viewed in this way, the generator is a two pole machine.

The voltage generated between the load brushes will be the algebraic sum of two components of voltage, one component being generated under the horizontal poles, the other under the vertical poles. If the shunt field current be kept constant, then the component of voltage generated under these horizontal poles will be constant also and may be used for the constant excitation. A third brush, therefore, is provided so that this constant voltage compound may be used. The shunt coils are supplied with a constant current from the third and negative-load brushes, as shown in Fig. 5. A field rheostat is provided to acord control of the shunt field current.

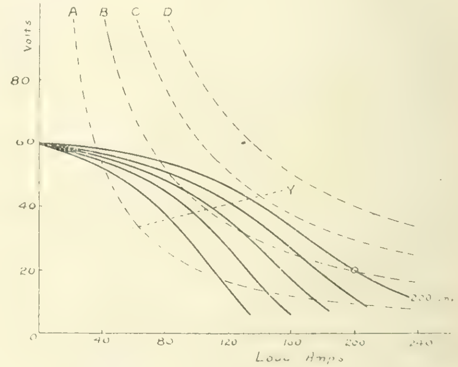


Fig 6—Voltage current characteristic of special self excited, differentially compounded arc welding generator

The series coils are connected in parallel and divide the load current equally between them. As the load increases the vertically opposite poles become gradually weaker, the component of voltage generated under them gradually less, and the terminal voltage also less.

With a certain load current it will be possible for the series windings to just neutralize the effect of the shunt winding with which condition the generated voltage will be only that which is generated under the horizontal poles. Further increase in the load will reverse the polarity of the vertically opposite poles, thereby causing the component of voltage generated under them to oppose directly the constant component generated under the horizontally opposite poles. The terminal voltage, then, will be less than the constant component.

The generators of this type now in use for welding are designed to give 60 volts at no load, the constant component being one half of this value. They are arranged to give 20 volts at full load (200 amps.) but are connected to a dial switch on the control board in such a way that the adjustment of the number of effective series turns may be easily made by an operator. With the scheme used, the machine may be adjusted to reduce its terminal voltage to 20 with any flow of current desired. Fig. 6 shows the characteristic curves obtained with various adjustments of the number of series turns in circuit. At points along the dotted line "Y," Fig. 6, these curves are approximately constant power characteristics.

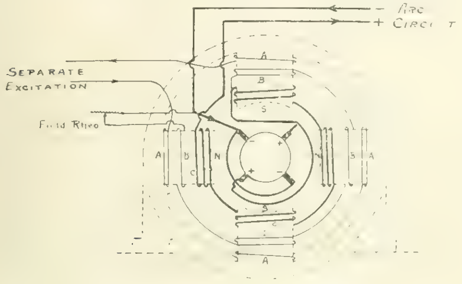


Fig. 7—Separately excited, self excited, differentially compounded generator

(c) The Separately Excited-Self-Excited Differentially Compound Wound Generator

This machine is quite simple, as the diagram of Fig. 7 indicates. It is a four pole generator having, on each pole, two shunt coils and one series coil. An exciter, direct connected to the generator, provides the separate excitation to all poles by means of one set, "A," of shunt coils. The set "B" of shunt coils has a straight shunt connection with the armature of the generator. The set, "C," of series coils is in series with the armature carrying the load current and opposing both the separate and self excitation, (these two having the same polarity).

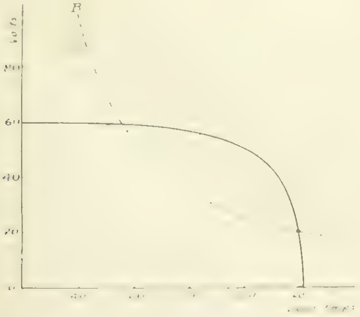


Fig 8—Voltage-current characteristics of self-excited, separately excited, differentially compounded welding generator

The peculiar characteristic of Fig. 8 is thus obtained when the correct adjustments are made. This is the full load curve, intersecting the constant power curve (dotted) at the point,—20 volts, 200 amps., which is considered to be normal operating conditions.

The separate excitation, and also the self excitation are adjustable by means of field rheostats. Where lower than full load current (200 amps.) is required these field currents are adjusted and characteristics as shown dotted, (Fig. 8) are then obtained.

(d) Special Constant Power Generator

The writer now wishes to draw attention to a design of generator which in his estimation will more nearly approach the theoretical constant power generator than any already described.

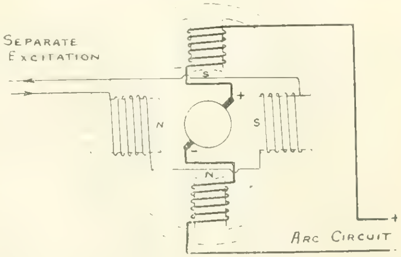


Fig. 9—Wiring of special constant power generator, separately excited on two poles, series differential winding on other two poles

The frame of this machine will have four poles as shown in Fig. 9. The two having horizontally opposite poles will be separately excited from some constant source. The two vertically opposite poles will be smaller in cross section than the former and will have only series coils which are connected in series with the armature to carry full load current. (In this particular case vertically opposite poles have fifty-eight per cent. (58%) of the area of the horizontally opposite poles).

The armature will be of the two pole type with wave winding. Only main brushes diametrically opposite will be required.

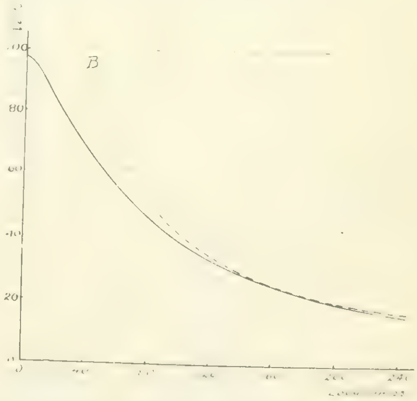


Fig. 10—Volt-ampere characteristic of special constant power generator, separately excited on two poles, series differential winding on two poles

The voltage generated in this machine will be the algebraic difference of two components, one of which is constant, the other variable. The vertically opposite poles are made small in cross section in order that they may saturate while generating a lower voltage than that caused by the horizontal poles. The component generated under these small poles will follow the saturation curve of iron and the resulting total generated voltage characteristic will be a curve resembling an inverted saturation curve. After making due allowance for the voltage drop in the armature we obtain the characteristic shown in Fig. 10, which, through a considerable range, is very close to the constant power curve "B," (dotted).

It will be observed that the no load voltage is limited to about 100 volts. The short circuit current is also limited, partly by armature internal resistance and partly due to the fact that net generated voltage is reducing as current increases in the armature.

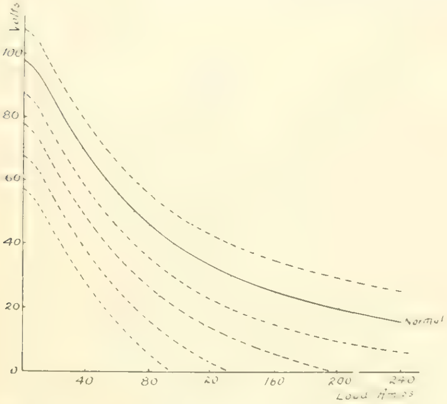


Fig 11—Result of varying separate excitation without changing effective series turns

The characteristic, therefore, is a very desirable one.

This generator permits of two adjustments, not including that of speed,—namely—adjustment of field current and of effective series turns. Increase of field current increases the voltage at any point, and vice versa. Fig. 11 shows by dotted lines a number of characteristic curves obtainable by varying field current only.

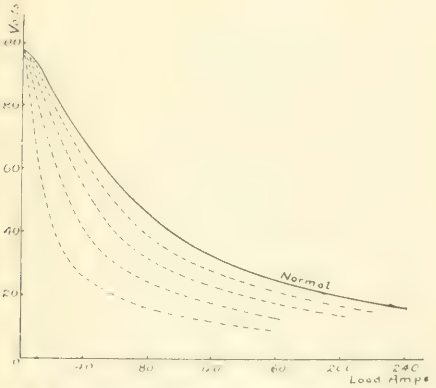


Fig. 12—Result of varying effective turns without changing separate excitation

Increase of effective series turns without change in field current, will reduce the voltage at all points except at no load, but will not be as effective as might be imagined in limiting the short circuit currents. The curves obtained by various increases in the number of effective series turns only, are shown in Fig. 12.

The permissable adjustments in this generator make it possible to obtain constant power characteristics for practically any desired voltage and current, with stable operation at all points. As mentioned before, constant power generators are at present used only for electrical arc welding with the metallic electrode. Other uses, however, may be found for a machine as just described, in which case this close approximation to the theoretical curve may be more fully appreciated in the engineering world.

This generator is intended to be operated at constant speed; it will compare very well with the other machines described in its efficiency and will require a practically constant driving torque.

Transmission Line, Galetta to Carp

The Marchand Electrical Company, of Ottawa, have just completed a transmission line from Galetta, Ont., to Carp, Ont., a distance of sixteen miles. Power is transmitted at 13,000 volts, 3 phase, 60 cycles. 35 ft. cedar poles are used; 45 ft. and 50 ft. poles are used for railway and telephone crossings; the pole spacing is 150 ft. The conductors are three No. 6 hard drawn copper wire. Construction was started on August 15th, 1919, and the power was turned on December 11th, 1919. The line passes through the village of Kinburn, Ont., and through a very prosperous farming country, supplying several farmers with power and light. This line was built for the Galetta Electric Power and Milling Co. Mr. E. F. Marchand was superintendent of construction.

Persona

Mr. J. G. Ramsden, of the firm of Ramsden & Roxborough, electrical contractors, has been elected a member of the Toronto Board of Control.

Mr. H. E. Carter, contractor-dealer, Niagara Falls., Ont., was elected to the Hydro Commission by a large majority at the New Year's election.

Mr. Herbert P. Thomas has resigned the position of city electrician of Nelson, B.C., and will return to Australia. He will be succeeded by Mr. D. E. Maguire, chief electrical engineer for the past eight years at the smelter of the Consolidated Mining & Smelting Co., Trail, B.C.

Mr. F. S. Montgomery, for the past six years advertising manager, National Metal Molding Company, Pittsburgh, and prior to that, for several years district manager in charge of the Atlanta office of the same company, tendered his resignation to take effect December 31st, and has become associated with the Ivan B. Nordhem Co., Outdoor Advertising, 8 West 40th Street, New York City. Mr. Montgomery's successor has not been announced.

Mr. Edward D. Kilburn, who since March 15, 1917, has been New York district manager of the Westinghouse Electric & Manufacturing Company, was recently elected vice president and general manager of the Westinghouse Electric International Company. The Westinghouse Electric International Company was formed in the spring of the present year to succeed the Westinghouse Electric Export Company. It handles the Westinghouse foreign business and is worldwide in its scope, exclusive of the United States and Canada.

The Electric Club of Toronto held their first luncheon of the year 1920 on Friday, January 9. The speaker was the Rev. Dr. Pidgeon on the subject "Some Problems of Citizenship." The fame of the speaker had preceded him and the capacity of the dining room at the Hotel Mossop was over-taxed.

Electrical Progress During the Past Year

The Largest Turbo-Generator Unit—The Largest Furnace Installation—The Largest Locomotives—Transformers with Record Rating

Following their usual custom the Westinghouse Electric & Mfg. Company prepare at the end of each year a general summing up of the progress made during the twelve months just past in the electrical industry. The introductory paragraph this year is unusually hopeful and encouraging and runs as follows:

With the placing in operation of the largest turbo-generating unit ever built; the delivery of the electrical equipment for what will be the world's greatest furnace installation; the breaking of the record for size in the construction of electric locomotives; the export shipment of the electrical apparatus for what will comprise the first electrically-driven steel blooming mill to be erected in the Far East; the completion of the design for a transformer of higher rating than of any that has yet been manufactured; the beginning of work on the installation of a hydro-electric generator of uncommonly high capacity; and many other successful achievements, the 1919 resume of the Westinghouse company presents numerous outstanding features.

Items of special interest are as follows:

Steam Turbine Generating Units

A notable installation is the 70,000 kw., 25 cycle, three-element, cross-compound unit placed in service during the past year at the 74th Street Station of the Interborough Rapid Transit company of New York City. The unit is rated at a capacity of 60,000 kw. continuously, or 70,000 kw. for two hours, and is, therefore, the most powerful prime mover in the world. It has three elements, one high pressure and two low pressure, and it is the first triple cross-compound turbine to be placed in operation. All three elements operate at 1,500 r.p.m., and each turbine drives a generator rated at 20,000 kw. continuously, 23,500 kw. for two hours, and 30,000 kw. for a half hour. The generators deliver three-phase, 25-cycle, 11,000 volt alternating current.

Condensers

The company has completed the largest jet condenser it has ever built. The condenser is capable of passing 13,000,000 pounds of water per hour. It was built for the Alabama Power Company.

There is at present being built for the Southern California Company a 15,000 kv.a., 600 r.p.m., 50/60 cycle, frequency changer set. The distinctive features of this set are: First, its capacity, this being one of the largest units of its type thus far for to be built; and, second, the voltage, the motor and generator being designed for 15,000 and 18,000 volts normal operation respectively. There is also nearing completion a 32,500 kv.a. 12,000-volt, 3-phase, 25-cycle, 150 r.p.m., vertical hydro-electric generator, which is being built for the Niagara Falls Power Company.

Transformers

The outstanding features in transformer design for the year 1919 have been chiefly a matter of size of units. There was completed during the year a number of 8,333 kv.a. self-cooled transformers. These are the highest rated of the self-cooled type built to date. They are for 66,000 volt service. The design has also been completed for a 23,600 kv.a. water-cooled transformer for 132,000 volts. This is the highest rated transformer yet attempted, and in physical size it will be considerably larger than its nearest rival. The building of eleven 11,500 kv.a. water-cooled transformers for 150,000 volt service is being completed. These transformers are designed for 72,000 volts low tension, and for delta connection on the high tension line.

Electric Railways

The developments of 1919 in heavy traction work have resulted in the largest electric locomotive yet built and applied to both the a.c. and the high voltage d.c. systems. The company is building for operation on the Chicago, Milwaukee and St. Paul Railway ten 4,000 h.p. direct-current locomotives to operate from a 3000-volt over-head trolley. These engines are to handle all the passenger service over the present electrified section of the road.

In the a.c. field the company has supplied the New York, New Haven and Hartford R. R. with five new locomotives, 50 per cent. larger in capacity than any that they have previously operated. These are of the a.c.-d.c. type and similar in design to the former engines, except that one additional pair of driving axles is added to each truck, making a total of six per engine, as compared with the former engines, which had four.

During the past year the large a.c. freight locomotive built for the Pennsylvania Railroad, has been put in commercial operation on the main line electrification at Philadelphia, and has been doing wonderful work. This engine represents the maximum in horsepower for electric freight engines, having a capacity of 4,800 h.p. and a total weight of 250 tons.

The outlook for the future in heavy traction work is very promising, as the war conditions have brought home to most people the desirability of economy and conservation in fuel and, at the same time the advance in wages has necessitated a renewal of the study of operation with a view to cutting down to a minimum the use of labor for the accomplishment of a fixed result in both operation and maintenance of railroads.

Street Railways

In general, the greatest developments during the year, in this field have been the perfection of motor details and standardization of safety car equipment. On account of the pendulum swing to somewhat heavier weights in safety cars, namely, from 13500 to 16500 or 17000 pounds, motors with more capacity and larger bearings, etc., have been developed to meet these heavier weights and insure the usual margin of capacity in the motor sizes. The greatest contribution to the art in street railway practice this year, is the helical gear.

Industrial

In the readjustment of manufacturing conditions since the war period, much study has been given to the improvement of quality of product, increase of production and reduction of cost. The two main factors to be considered are labor and power economy. The electrification of industrial plants has done more to better conditions of manufacturing than any other single improvement. During the war period, the value of this type of drive and its many incidental advantages were readily appreciated when plants were being remodeled to meet the various conditions of war requirements, and the speed with which plants were changed over to product new lines of products, to increase their capacity and in other ways to add materially to the flexibility and mobility was really marvelous. In fact, without electric drive it is doubtful if such results could have been obtained. Much has been done during the present year, 1919, to add to the advantages of electric drive and to improve the details of the design of apparatus.

Arc Welding Equipment

The use of the electric arc as a practical and economical method of fusion of metal in manufacturing processes has extended so rapidly during the past two years that new types of equipment have been developed to meet the particular requirements of the service. Although the arc welding process has been used for years on special applications, for repair work, and in general foundry work on repairing defective castings and similar applications, its economy in general manufacturing processes, has only lately been realized. The tendency is toward units of a capacity large enough for one operator only. These units may be stationed about the shop or yard at points where they are to be used or are readily made portable so that they can be moved to the point at which work is to be performed.

Cold Storage-Ice and Refrigeration

The large number of new ice plants built and the number changing over of the present steam plants to electric drive has increased the use of synchronous motors to drive ammonia compressors more than ever before.

Small Motors

There has been an enormous demand for small motors principally in connection with motor-driven machines for domestic service, such as washing machines, ironing machines, vacuum cleaners, sewing machines, dish washers, etc. This demand has been due to the great shortage of labor and the ability of many individuals to buy these machines, who in years past were unable to do so. The manufacturers of these devices, generally, cannot meet the demand. There is a large call also for these devices in export fields and in Canada.

Agriculture

In the agricultural field there has been a considerable impetus in the use of central station power. Groups of farmers are clubbing together and arranging for a joint circuit which gives them all the advantages of the city man. To an even greater extent electric farm units are being used. The most popular size and type is that of a direct connected unit employing a gasoline engine direct connected to a 1-kw. 32-volt generator with a control panel mounted thereon. A lead battery is mounted separately. The unit is self-cranking and arranged so that it will automatically stop after a pre-determined length of run. These units are used principally for lighting, but also for the operation of small motor-driven machines, particularly house pumps, washing machines, churns, cream separators, sewing machines, etc.

Bread Baking

The company has been experimenting for the past 18 months with electric ovens for the baking of bread, pies, cakes and pastries. Recognizing the superiority of a revolving type oven of small capacity, such as would be suitable for hotels, cafeterias, public institutions as well as for the public bakery, experiments were started to determine the possibility of applying heater to this type of oven, and to determine the advantages of electric heat. After exhaustive experiments the company has produced results incomparably better than heretofore obtained with any other type of oven or with any other form of heating.

Marine Apparatus

The U. S. Navy Department has pushed forward with its previously established policy of using turbine electrical propulsion equipment for super-dreadnaughts, and has placed orders for four such equipments. The general scheme follows closely the one used for the battleship "Tennessee," which has been launched and which will be subjected to its sea-trials early in 1920. A single induction motor is directly connected to each of the four propeller shafts. Electric power is furnished by two turbine generator units which receive their excitation from auxiliary turbine generators. The desired ship speed is obtained by varying the number of poles of the motors and by changing the frequency impressed upon them.

Notable Export Shipments

Especially prominent among the company's export shipments during the year, have ben the following:

Steel Mill Equipment.—Seventeen carloads of electrical equipment for steel mill operation are now being delivered for installation with what will be the first electrically-driven steel blooming mill to be erected in the far East. This equipment is to replace a steam engine now operating a 40-inch reversing mill. The mill will form a part of the plant of the Imperial Steel Works of Japan, located near Tokio. The blooming mill in question will be capable of rolling steel ingots measuring 500 x 500 millimeters and weighing 3,000 kilograms normal or 5,000 kilograms maximum. The capacity will be 50 tons per hour. The mill will be operated by a 3500 h.p. single unit motor, of the reversing blooming mill type, taking direct-current power at a voltage of 600 and operating with a speed range of 0 to 100 r.p.m.

Steam-Driven Turbine Units.—Two 25,000 kw. steam-driven turbine units of Westinghouse make, which, when installed, will complete the largest steam-driven electrical installation inthe Far East, are now being erected at Osaka, Japan, for the Osaka Electric Light Company. This company furnishes light and power to street railways, steel works, ship builders, copper refining plants, paper mills, electro-chemical installations and other industries.

Electric Furnace Equipments.—Electrical equipment for twenty electric furnaces which, which, when placed in operation, will comprise the largest electric furnace installation ever made, has been manufactured by the company and shipped to the Glomfjord Smeltverk Company of Glomfjord, Norway.

Conclusions

The trend of the year's developments would seem to indicate:—

1. A growing tendency toward the centralization of power generation for large areas. This is evidenced by the ever-growing loads on the stations of public utility companies with a consequent demand for larger power units.

2. A generally acknowledged pre-eminence of electric drive in the industrial field. Most modern factories and mills are now using this form of power in preference to steam.

3. An increasing use of electric power for industrial heating as shown by the success that is being accomplished in the electric welding field; the demand for electric furnace equipments; and the increasing popularity of the numerous smaller applications in this line.

4. That electricity is beginning to revolutionize agricultural life not only by making it more profitable, but by providing it with many of the comforts and conveniences heretofore found only in the city.

5. The increasing application of electrical appliances to the performance of various duties in the home, thereby eliminating much of the drudgery and bringing cleanliness and comfort.

6. The approach of an all-electrical age, in complete reality.

New Power Station at Drummondville

Two Initial Units of 3,500 H.P. Each—Transmission at 48,000 Volts—Other Developments to Follow in Near Future

The new power station of the Southern Canada Power Company, at Drummondville, Que., is one of the chain of stations to be built at the various water power sites owned by the company on the St. Francis and adjacent rivers.

The station operates in parallel with the other plants of the company, and the power is put out on the Company's transmission system, which supplies Drummondville, Richmond, Sherbrooke, Granby, St. Johns and St. Hyacinthe, and intermediate towns in this district.

The equipment of the plant consists of two 3500 h.p. vertical shaft water wheels, manufactured by the Boving Hydraulic & Engineering Company, direct coupled to vertical shaft Westinghouse Generators, three phase 3125 kv.a. 2300 volt 60 cycle, 100 r.p.m. The wheels are governed by the latest pattern of Woodward oil pressure governor, 30,000 ft. lbs. capacity, and the plant operates very well in parallel with the other power stations of the company. The generators are fitted with an air brake, the pressure for which is kept up in a container by a motor driven air pump, operated by an automatic air pressure switch. There are two exsiter sets of 100 k.w. capacity, either of which is capable of providing excitation for the entire plant at present installed; together with contemplated extensions. Both exciters are arranged for use with voltage ergulators. One of these sets is driven by a water wheel manufactured by Boving Hydraulic & Engineering Company, and governed by a Woodward governor. The other exciter is driven by a 2,300 volt 3 phase induction motor. These exciters are both fitted with equalizing switches and feed to exciter busses, from which the station emergency lighting and relay system are also operated. The switchboard is on a gallery overlooking the entire operating floor. It consists of eleven panels. The first panel is fitted with meters and switches for the control of the d.c. side of the two exciters. The second panel provides for the control of the a.c. side of the motor-driven excited set. The third panel provides for voltage regulators. The fourth and fifth panels control the two vertical shaft generators. The governors for each of the main units are also electrically controlled from the panels. The sixth and seventh panels provide for future generators. The eighth panel contains the totalizing instruments. The ninth panel controls the transformer tank, which feeds on to the outgoing 48,000 v. line. This panel contains a switch for the electrical operation of the high tension oil circuit breaker. The tenth panel is for the control of a one to one transformer insulating the busses from the local feeders. The eleventh panel controls the station service and local feeder circuits.

The oil switches are, with the exception of the station and local service circuits, all mounted below the gallery. Double bus operation is provided for throughout.

The transformer bank consists of three 1000 kv.a. oil filled, water cooled 2,200 to 48,000, with taps. There is a spare transformer of the same size, and by means of the transformer disconnecting switch arrangement, any of these four transformers may be included in the bank with the minimum of delay. The oil pumps and water circulating pumps are electrically driven, and are all in duplicate. All of this auxiliary machinery is located in the basement. Above the transformers, on a gallery, are placed the electrolytic lightning arresters, and the 48,000 volt oil and disconnecting switching, and choke coils. The high tension connections passing thence to the out-going line.

The gate room is separated from the main operating room by a longitudinal wall, and forms a mezzanine floor. The main gates are electrically operated, by means of a motor with clutch and counter shafting. The racks are also located in this room, and between the racks and forebay there is a curtain wall. At one side of the forebay theris a trash gate. The sluice way is provided with 10 sections and the stop logs are operated by a lifter, which is electrically driven. The approach to the sluice way is by means of a tunnel.

The spillway section is provided with receptacles for the installation of flush boards when required.

This power development is in the middle of several other deevlopments owned by the Southern Canada Power Company, which are larger, and one of which has considerable storage capacity. It is proposed to develop these, and operate them in conjunction with the plant herein described; thus furnishing an abundant and reliable supply of electric power to the prosperous territory covered by the transmission system.

Toronto Endorses Eastern Radial Scheme

By a majority of 22,351 to 2,433, the ratepayers of Toronto voted to spend $4,328,665 as their share of the Toronto-Eastern radial scheme. The proposed route is as follows: Commencing at the proposed terminal in the city of Toronto, the line extends easterly over the property of the Toronto Harbor Commission, thence northerly to the C. N. R., thence easterly to a point near where the C. N. R. crosses St. Clair Avenue, thence extending easterly in a general direction parallel to the G. T. R., crossing Kingston Road at a point near where the latter is intersected by that railway, thence easterly roughly paralleling the Kingston Road to Pickering. From Pickering east the line follows the right-of-way of the present Toronto Eastern Railway, through Concession II. of the Townships of Pickering, Whitby and Whitby East, passing through the Town of Whitby and Oshawa, thence through Concession II. of the Township of Darlington to Bowmanville.

The Trouble in Calgary Generators

Montreal, Dec. 19, 1919

Editor, Electrical News

It was with considerable surprise that I read your article (issue of Dec. 15,) describing the trouble at Calgary in connection with their turbines, as I did not think that any manufacturer at this late date was using any material in the rotating field that would permit the winding becoming loose or distorted due to the compression of the insulating material, resulting from both expansion and contraction and the centrifugal force due to the high speed which compresses insulating materials which are even much stronger than fullerboard and presspan. I have seen considerable damage done to ordinary slow speed water-wheel driven generators due to shrinkage of the insulating material, plus the compression resulting from centrifugal force, which in my opinion was the cause of the trouble at Calgary.

R. S. Kelsch.

Power plant from forebay—Southern Canada Power Company, Drummondville, Que

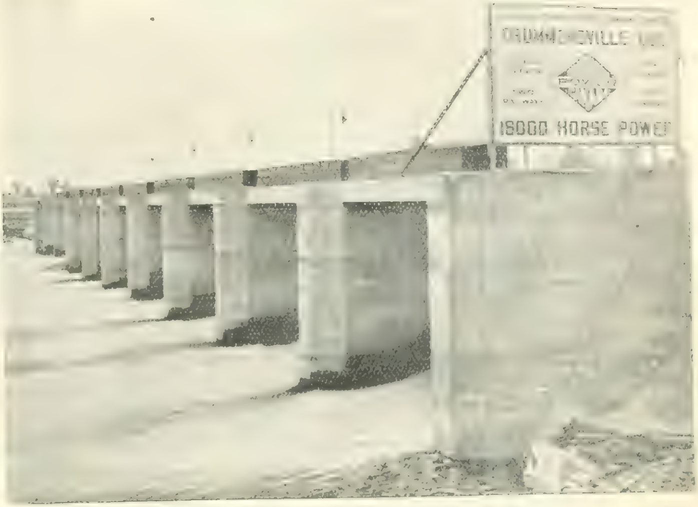
Generator room

Switchboard and l

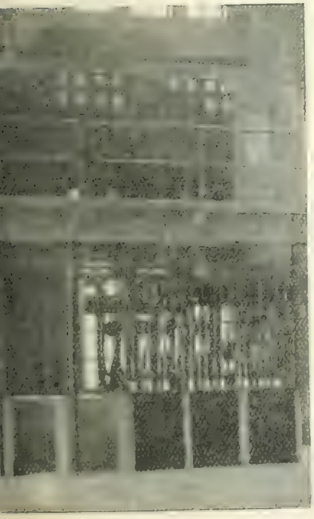
Power plant from downstream side

Some Views of th
at Drumm

3500 h p units



Stop-log section of dam—Logs are operated by a lifter which is electrically driven



on bus structure

Transformer room—Oil-filled water-cooled units 2200/48,000

New Development
ville, Que.

Grounding of Electric Currents and Equipment

By Mr. J. G. Jackson*

It is not the writer's intention to present any new new material in the present paper, but merely to bring before the Association for the purposes of discussion a somewhat general analysis of the methods and the advantages or otherwise of the grounding of electrical currents and, equipment.

Ground connections are ordinarily installed for the following purposes:

> To prevent possible high potentials on low potential circuits or frames of equipment which may ordinarily or accidentally be handled by the public, as in the case of lighting and motor circuits and apparatus connected thereto, and also in the case of station and line equipment handled by employees of distribution companies.

Such over potentials would ordinarily result from accidental contacts with high potential circuits or from failure of the insulation of transformers or cables or other equipment. Frames of machines or even insulated circuits may at times accumulate static charges or transient induced potentials of high value which may be productive of serious troubles if not discharged or prevented by an effective ground connection. In the case of distribution systems with a common primary and secondary neutral or ground wire carrying primary current under conditions of unbalance or single phase load, the mere breaking of this neutral may give rise to full primary line voltage on the ground wire and secondary with consequent life and fire hazard unless the type and location of grounds is such as to prevent the complete severance of ground connections. Grounds are also installed for the earthing of over-potentials resulting from lightning discharges. Effective grounding is sometimes also required to prevent damage to cable sheaths by electrolysis.

It is no doubt apparent that so far as danger to the public is concerned the vital necessity for the grounding of electrical circuits is most evident in the cases where secondary circuits are tied in with primary circuits in such a manner that abnormal potentials would almost of necessity frequently result if it were not for the ground connection. This would be true of the Y connected primary system with common primary and secondary neutral or ground wire. In the cases where dangerous potentials on secondary circuits and frames of equipment are possible only as a result of accidental contacts or failure of the insulation of transformers or other apparatus the advantages of grounding are perhaps not quite so clear. Cases are quite common where severe and even fatal shocks have been experienced from 110 volt circuits by persons standing on grounded metal or on damp floors, or in bath tubs and in contact with plumbing where such shocks quite probably would not have occurred had the circuit not been grounded. Cases have also been known where fires in dwellings and commercial premises have resulted from the discharging of heavy currents to earth through the grounded lighting circuits. On the other hand where accidental contacts or defective insulation might result in abnormally high potentials on a secondary circuit the grounding of one side of the low voltage circuit will ordinarily limit the potential rise to a comparatively safe figure if the contract occurs on a live side of the low voltage circuit or will entirely prevent any appreciable rise if the contact is on the grounded side, assuming of course that the ground is of an effectual type. The weight of opinion in this country appears to be in favor of the grounding of all low voltage circuits on the assumption no doubt, that the avoidance of high potentials with consequent great dangers resulting from the ground connection itself.

Locating the Ground

In locating grounds on distribution systems it is necessary to consider the purpose which the ground is to serve. It is probable in the first place that the ground on a secondary circuit is intended to protect the secondary from primary potentials which might result from defective insulation in a transformer. For this reason it is evident that the ground should be at the transformer. This is also particularly essential where transformers are connected to grounded primaries.

As it is evident that transformer grounds in such cases may be required to carry considerable current it is essential that they be of the most effective type. Water pipe grounds in such case should be used if at all possible and failing this an effective type of cone or cylinder buried in permanently moist soil should be employed. The driven pipe or coiled ground wire cannot be considered suitable under such circumstances. Where grounds are called for at intervals along secondary lines not at transformers these grounds will probably only be required as lightning protection and perhaps to ground foreign circuits which may fall across the secondary. A driven pipe ground in such cases may be considered sufficiently effective particularly as it would ordinarily be in parallel with other grounds.

The effectiveness of various types of ground connections in ordinary use varies greatly. There is also a considerable variation of practice in the location of grounds on distribution systems.

The usual types of grounds are:—

A water pipe system.

Various types of ground cones or cylinders.

Driven pipes.

Ground wires around butts of poles.

Lightning arrester grounds will ordinarily be required at transformer locations and these should be as good grounds as possible. Care should be taken, however, to maintain ground wire and grounds for lightning arresters absolutely distinct from the transformer or secondary ground as it is evident that discharge potentials might otherwise be communicated to the secondary system. The use of underground pipe systems, usually water pipes, for grounding purposes is ordinarily conceded to be the most effective, but it should be understood that the value of such a ground connection may be limited not only by the extent of the pipe system but also by the nature of the joint between lengths of pipe, insulating materials sometimes being used in making the joint. The connection between the ground wire and the pipe is also important. It is sometimes possible to tap a hole in the pipe, preferably in a flange, making the connection by means of a set screw set up tight. A band tightly clamped around a pipe, if the surfaces are cleaned will probably also serve very well. While the end of the ground wire twisted around the pipe is probably the readiest method, it is only reliable if very carefully done.

Other Types of Grounds

It is not always possible to find a water pipe at hand for grounding purposes and for this reason the various other types of grounds referred to are frequently used.

The cylinder ground which I have referred to is a variety made up to meet the requirements for a suitable grounding device at least as effective as the usual copper ground cone, but of lower cost and of a style which could be installed about as easily as the driven pipe. This ground is made up by rolling a sheet of toncan metal in an open cylinder, 8 inches in diameter, bolting and soldering a 5/16 inch or ⅜ inch galvanized stranded guy wire used as a ground wire to one edge of the sheet. The ground is installed by boring an 8-inch hole with a telescopic boring tool to a depth of six to eight feet, which can be done by one man in ten minutes, inserting the cylinder and ramming it full of charcoal or soil as desired, and thus expanding the cylinder and making good contact between the outer surface of the cylinder and the surrounding soil. The hole is then refilled and the ground wire extended up the pole, in the usual case. Specimens of these toncan cylinders have been dug up after being in use several years and were still in perfect condition. The steel stranded cable has been used instead of the copper ground wire sometimes favored in view of the less liability of an accidental severing of the ground connection and also because of the affinity which some individuals have shown at times for any unprotected bits of copper which might be picked up or snipped off.

---

*[illegible]

In closing, the writer wishes to say that if this paper has suggested the exchange of any useful views on the part of the members of this Association on this quite important subject, he will feel that it has served its purpose.

An Industrial Lighting Campaign

Inaugurated by the Society for Electrical Development—The Prospectus Below to be Followed by More Specific Details

Undoubtedly the most comprehensive investigation of recent times, as regards the role which artificial lighting plays in industrial processes, was that conducted a few months ago by the Commonwealth Edison Company of Chicago. The startling facts brought out by this investigation demonstrate conclusively that the beneficial effects of good lightting in facilitating and speeding up accurate production have generally been underestimated. This information in itself is valuable, but what is even of greater importance is to know how big the present need is for better lighting.

In one machine shop under consideration in the Chicago tests an increase in production of from 8 to 27 per cent. was obtained when the lighting intensity was increased from 4 to 12 foot-candles. These figures covered eight different operations, which averaged 15 per cent. increase. An increase of 20 per cent. in production resulted from improved lighting in a shop finishing iron pulleys. In another test where the workers were assembling carburetors the efficiency was raised 12 per cent. through no other change than an improvement in the lighting. The number of rejections in the finishing department of a tannery was reduced 80 per cent. by the installation of a good lighting system.

We cite these four cases merely to show specifically the extent to which lighting was found to be a factor of paramount importance. It is true that the investigation was local considering the territory covered, yet it is not unreasonable to suppose that the industrial conditions are any worse or better in Chicago than elsewhere. As a matter of fact there has just been completed a very extensive survey of the industrial lighting field which shows that this is undoubtedly true, and which proves definite evidence relative to a variety of important features upon which hithertofore it has been possible only to speculate It might be pointed out in passing that in the planning of this survey careful thought was given to the selection and assignment of the investigators.

The survey covered a total of 446 industrial consumers, interviewers being distributed among various officials throughout 15 states and 57 towns. The states were those in which a large percentage of the industrial acitivity of the country is concentrated.

Among other facts gathered in this survey are the following:

That 25 per cent of the work done in factories throughout the year is done under artificial light.

That 85 per cent. of the manufacturers interviewed were more of less satified with their present lighting conditions, and yet only 40 per cent. of the plants visited were adequately lighted. Better illumination was needed in 60 per cent. of them.

80 per cent. of the manufacturers expressed their appreciation of good lighting from the standpoint of its stimulating effect on output.

70 per cent. appreciated its effect on decrease in spoilage; 60 per cent. on prevention of accidents; 50 per cent. on improvement in discipline, 40 per cent. on improvement of hygienic conditions; only 16 per cent. expressed themselves as disinterested.

In analyzing who authorizes changes in lighting and the purchase and installation of equipment, it was found these matters were decided in 36 per cent. by the general manager, 22 per cent. by the president, 20 per cent. by the purchasing agent, 10 per cent. by the superintendent.

It will be seen from these percentages that, generally speaking, it is the executives who should be approached in regard to improvements in factory lighting, and that the big majority of them appreciate the possibilities of increasing their output, reducing their spoilage and their accidents through proper illumination.

The Society for Electrical Development publish the above information in a recent prospectus and offer the following further suggestions for the operation of an industrial lighting campaign by companies and municipalities covering more particularly the direct-by-mail feature:

The First Step—Size up Your Possibilities

Next to personal sales effort, to be discussed later, the most important feature of the campaign is sizing up the sales opportunities presented for such a campaign. By this we mean getting specific, definite information on the lighting needs of every plant in the territory to be covered. This is no small task nor one that can be accomplished in a few days. It calls for personal knowledge regardless of how the data is secured, and it means knowing what person or persons in each plant you should approach with your better lighting proposition. Names of all such parties will constitute your prospect list.

In preparing an effective list we know of no better method to adopt than of making your salesmen or solicitors responsible for names on it. In the course of their daily work, or even if they devote their entire time for a few days investigating the field, they are in the best possible position to furnish you a first class set of names. It will be time well spent. Not only will you have exact knowledge of the sales possibilities open to you, but in seeking out prospects your salesmen will obtain a better grasp on the situation to start with and will be more likely to have a keener interest in the campaign.

We particularly urge that your prospect list show the correct initials of the men whose names comprise it.

Sell Good Lighting—Not Merely Equipment

As pointed out above, the lighting conditions of the majority of industrial plants are far below the standard of good practice. Certainly one of the factors contributing to this state of affairs is that the salesman has too often been content to take orders for equipment rather than sell the idea of adequate illumination to meet the specific manufacturing needs. This is probably due to the fact that many a salesman feels he is not a lighting expert and that he would be "stumped" if the laying out of a lighting installation conforming to engineering standards was squarely put up to him. As a result we see repeated instances of bad lighting conditions as a direct effect of his equipment sales. This situation has been more evident since the Mazda C lamp has come into such widespread usage. Case after case comes up where these high-powered, brilliant units have been installed with no provision made for shielding the eyes from excessive glare. In fact, it is on record that hostility to the Mazda C lamp has developed in certain quarters for this very reason.

It is good lighting the manufacturer is interested in—and not merely the means used to provide him with that lighting. So good lighting service is the logical commodity that the salesman should find carries the strongest appeal. True, it will mean that he must familiarize himself with some of the fundamentals of good illuminating practice, but this can be done if he is willing to devote a little study to the subject. We have compiled the fundamental facts in a data book which anyone can understand with but little application, and which will be ready very shortly.

In this connection we would suggest that you impress it upon your men that they need not be afraid of selling lighting. Good installations are largely the result of using common sense anyway. Besides lighting equipment has been so simplified within the last few years that ordinarily any lighting installation can be taken care of with two or three sizes of mazda C lamps and one or two sizes of standard types of reflectors.

Personal Solicitation—The Most Important Factor

The primary object of the direct-by-mail feature of the campaign is to prepare for lighting sales rather than to make such sales directly. It is not to be expected that letters and folders will induce a great number of factory managers to come to you in regard to equipping their plants with better lighting facilities. Moreover, you should not expect the majority of factory executives on your mailing lists even to reply to your letters. However, you may be certain that your advertising messages will get attention, and when you start in to call on each of these factory executives, lighting sales will be more easily made, inasmuch as your advertising has paved the way.

The Foot Candle Meter

One of the best arguments which a salesman can use to induce a manufacturers to remodel his lighting equipment is to show him exactly how his present lighting falls short of the mark. Unless, however, his lighting is pretty bad, this is sometimes a difficult proposition to do. It can be done, however, if the salesman has with him some sort of device which will measure precisely the amount of illumination which any plant installation is furnishing. Such a device is the foot-candle meter. a handy little instrument which will show instantly the intensity of illumination at any point. Simply place it on the floor or on a bench—anywhere, in fact—and the foot-candle intensity of the illumination at that spot can be read. It is very simple in construction, consisting of a small metal case containing resistance coils, lamps, and a glass scale on which foot-candles are marked. The light from a small lamp of known candlepower offers a means of comparison with the room illumination at the point where the meter is placed.

The foot-candle meter is a remarkable sales and installation help to any salesman selling factory lighting. First of all, he can offer to go with the prospect to his plant any night and actually check up his present illumination. He can show him how the intensity of daylight varies at different points in his office or even on his desk. By reference to the data book he will know what foot-candle intensities are customarily accepted as good lighting practice for various factory occupations. By comparing the actual foot-candle meter readings with the proper figure in his data book he will be able to prove to the factory executive whether or not there is too little light in his plant.

The foot-candle meter, though a comparatively new development, has already become quite popular with central stations and electrical firms seriously interested in selling better factory lighting. We recommend that you procure one at least so that if an occasion arises when it can be used to particular advantage it will be available for any of your men. It will thus be a valuable adjunct to your campaign.

Advertising Features

The advertising features of the campaign are essentially of a direct-by-mail character. Thus your message goes straight to the men whom you know from the careful way in which your prospect list has been compiled, are the ones it will most surely interest. The advertising comprises six letters and it is suggested that enclosures pertinent to industrial lighting be mailed with each letter. It may be that you have printed folders of your own that would be suitable. If not, they can always be obtained from the manufacturers of lighting equipment.

Preparation of Letters

It is recommended that the letters be multigraphed on your regular stationery except for the names and addresses of the prospects and the personal signature. The name of the prospect in each case should be typewritten and made to match up with the multigraphed body of the letter. The size of the prospect list will not make it feasible to sign each letter with pen and ink. So it will be advisable to have a signature plate made that can be used on the multigraph machine. Any engraving house can make one for this purpose if furnished with a hand-written signature in black ink.

Mailing and Postage

It is recommended that the mailings of the campaign take place at week intervals and that each letter be sent out early in the week. The letters should be sent out under first-class postage unless sent in penny hook envelopes, in which case one cent stamps will be sufficient. It is not thought necessary to furnish return post cards with postage.

Keep Your Salesmen Advised

The closer the co-ordination between your advertising and the personal sales work of your salesmen, the more effective each will be. For this reason it is highly important that your men be kept advised immediately regarding the various mailings as they go out. Probably the simplest method of taking care of this feature would be to place the names of your salesmen on the prospect list, and they will automatically receive the same advertising material at the same time that their prospects get it.

Steps in Campaign

In summing up our recommendations for this campaign we believe that it should proceed in accordance with the following steps:

1. Make your survey and compile your prospect list.
2. Call a meeting of your salesmen to announce and discuss plans.
3. Provide bulletin board facilities for reporting the standings of the salesmen and the progress of the campaign.
4. Determine the dates of the various mailing in your advertising.
5. First letter with a postcard enclosure.
6. Begin follow-up by personal calls, and keep this activity going throughout the remainder of the campaign.
7. Second letter—printed enclosures—return post card.
8. Third letter—printed enclosures—return post card.
9. Fourth letter—printed enclosure—return post card.
10. Fifth enclosure—printed letter—return post card.
11. Sixth letter—special return post card—card to be printed "No, we are not afraid to know the truth about our lighting. You may send your representative with a foot-candle meter, on the expressed condition that his call will not obligate us in any way."
12. Institute the final follow-up to cover all prospects not previously called upon.

SOME LETTER SUGGESTIONS

Letter No. 1

Are You One of the 69 Per Cent.?

Of 446 factories investigated by experts from the National Lamp Works, 69 per cent. thought they had effective lighting when, as a matter of fact, they were losing money daily because the light was actually poor.

Some of the changes effected by improving the lighting were startling—for example, 35 per cent. increase in one factory's output at an expense for lighting equal to 5 per cent. of the payroll.

You don't believe any such statement applies to your plant ?

Well, neither did the executives of the plant where this result was obtained—until an expert forced his way in by almost burglarious methods and proved it by their own production and cost records.

We are writing to ask your permission to do this very thing for you. Let us, as experts, apply our specialized knowledge in your plant—let us show you how and where **mere light** will increase output, cut down spoilage and accidents. The chances are we can advance your net production at least 15 per cent. at a cost equal to from 1 per cent. to 5 per cent. added to your payroll.

Don't say "It can't be done." Say "Show me," and in all probability we can—at no expense to you or any obligation whatsoever.

When ?—and may we suggest that you make it soon!

Very truly yours,

Letter No. 2

Sample it Yourself

Take this letter out into your shop and read it under the same light that your operators work by. Do this and you'll probably realize why one of the main causes of waste time, spoilage and accidents is inadequate light.

And when we say "inadequate light" we do not mean cheap light—in fact, we're absolutely sure you are paying too much for lighting your plant, especially if you count the indirect costs.

You pay for light when a man stops work to re-adjust a drop cord.

You pay for light when a man has to carry his work to a window to make a fine measurement.

You pay for light—often a staggering price—in the form of spoilage.

Permit us to show you how these indirect lighting costs can be reduced. That is our business—reducing the cost of factory lighting.

Allow our man to visit your plant—investigate—study the peculiar requirements of your particular business and report to you personally. No charge, no obligation, and absolutely no argument.

Yours very truly,

Letter No. 3

We Believe We Can Increase Your Production

Ever lose a sale because the man who needed your goods refused **even to look at 'em** ?

Ever show a man a perfectly sound, simple, proven proposition and have him say "It can't be done ?"

If you have, you'll sympathize with us now.

Our proposition has increased the output of scores of industrial plants as much as 27 per cent. at a cost equal to 1 per cent. to 5 per cent. added to the payroll.

We believe we can increase **your** production.

We stand ready to investigate your lighting, absolutely without cost or obligation to you.

Now, are you going to say: "It can't be done "

Are you going to refuse to even **look** at what we have to offer ?

Or are you going to say "Show me ?"

Very truly yours,

Letter No. 4

Is Your Lighting An Asset or a Liability?

Which ?

You ought to know—absolutely—just as you ought to know the state of your production.

Better light may reduce your cost of production one or two per cent. Better light may reduce your payroll three to five per cent. Better light may save thousands of dollars annually in spoilage.

Unless you know—absolutely— just "where you stand" as regards cost and efficiency of your lighting, you may be throwing away (without knowing it) money that belongs to yourself or your stockholders.

Very few industrial plants in America are properly lighted. Some of the shrewdest executives in the country have "fallen down" in this important detail of their business simply because they—like you—have been intent on other problems, and they—like you—haven't realized the dollars-and-cents effect that mere light has upon the profit and loss account.

Let us be your lighting engineers and give you the facts—of course, without obligation to you. If our report proves that you are losing money, and how you are losing money, you will want to change your equipment—that's common sense.

We will tell you the facts, and you do what your business judgment dictates.

When may our expert call ?

Very truly yours,

Letter No. 5

You Wouldn't Think of Blindfolding Your Men

If they could work under such a handicap, they'd spoil every bit of material that went through their hands. Groping about they would be an easy prey for every sort of accident.

"Overdrawn," you say ? Wait.

Are you sure that right now your entire working force isn't working at times with what practically amounts to a partial blindfold over their eyes? For you get precisely the same results every time daylight fails—if your system of artificial lighting can't make good the deficiency. In other words, your production drops not only at night but each time the sun goes behind a cloud.

Except in the compartively few plants throughout the country in which the artificial lighting has been carefully planned, the losses due to poor light range all the way from hundreds to thousands of dollars annually. These losses are hard to locate—unless one is a good judge of what lighting can and should be made to do.

We can help you spot the weakness in your lighting. We say this because it is our business to be able to size up any lighting system and suggest improvements if needed. It may be that a suggestion or two from our lighting expert will show you how you can very materially pull up the efficiency of your plant.

At any rate we'll be glad to have him call on you at your convenience—and without putting you under the least obligation.

What do you say

Very truly yours,

The Contractor-Dealer

Electrical Merchandizing from the Viewpoint of a Municipal Hydro Department

By Mr. E. V. Buchanan*

The two ideas in this paper are, first, to try and bring home to you the great need for establishing Hydro Shops in all municipalities, and second, by relating experiences, to demonstrate how the Shops, when once established, should be developed. It is hoped that this paper may not seem dogmatic, but that it will start a train of thought which will result in a good discussion.

The great majority of the men in charge of municipal systems are mechanically and technically trained men, and have knowledge of or interest in merchandising, but if these men would only realize the tremendous future in the development of electrical apparatus in the home, they would at once decide to devote at least a small part of their time to merchandising and temporarily forget their substations and distribution systems.

It is only ten years ago that tens of thousands of horsepower sounded big to us; latterly we have been talking familiarly in hundreds of thousands, and now we can only think in millions. We talk of controlling the flow of the mighty St. Lawrence and the levels of Lake Ontario and even Huron to produce more and more power. Now, then, in this electrical age what is the first and best use to put this energy? Is not the appeal of the home and the family for help the most urgent? Business men may calculate to the last penny where their business is concerned, but ninety-nine out of every hundred are generous when it comes to the home and the comforts of the family circle. The average man will make all sorts of sacrifices, put forth extra effort, and spend much time on trains to provide a suburban home which he himself rarely has an opportunity to enjoy by daylight, solely in order that his wife and children may be comfortable. This desire for the happiness and comfort in the home is inate in every man. If you are convinced that a human appeal is a strong one, need it be discussed here, whether or no, electrical appliances provide an answer to the appeal. You know what the appliances are, and what they can do. At least it is sincerely hoped that you know what these appliances can do from experience in your own home. Don't try to sell appliances if your wife does not use them. It surely cannot be worth while spending the time to say to you anything of the labor-saving value, the comfort and the beauty in the home by the installation of electrical appliances. Are you doing your duty, Mr. Manager or Mr. Commissioner, to the community in which you are a servant if you do not preach this gospel and practice what you preach by selling appliances and selling more appliances?

Objections are raised that the municipality should not compete with dealers who are established for the specific purpose of selling electrical goods. You are not competing with any dealer by opening a Hydro Shop, you are co-operating with him and helping him. There is no place in the country, no matter how small, that cannot support double the number of electrical shops now in existence; the more shops the more business will be done. In London there were two contractor dealers before the advent of the Hydro, and they had probably a couple of irons and toasters each, as their stock of appliances. There are now a dozen such stores in addition to the Hydro Shop, to say nothing of the score of hardware stores and the department stores selling lamps and appliances. The dealers in London are now convinced that it would be an unfortunate thing for them if the Hydro Shop were to close its doors. All the public demand is that municipal enterprises should be operated on the same sound business basis that private corporations are conducted. It is generally the policy of privately-owned electric utilities to have their sales shop, and therefore why should not municipally-owned utilities follow suit?

Goods should, of course, be sold at a fair margin of profit, and the standard resale price on most articles is fair. Considerable net profit will inevitably be made by most Hydro Shops, because the resale prices have been made in the past with the idea that electrical appliances are generally sold by merchants who are not solely in that line of business and the turnover is not so great. Therefore, a better margin is thought desirable, but a Hydro Shop becomes a specialty store, and just as in the case of Woolworth's, where articles are sold for five cents that are sold as side lines in the grocery, hardware, shoe or drygoods store at twenty-five cents, goods may be sold at lower prices or profits will be larger. Don't worry, however, about making too much profit; you can hand that back indirectly to your citizens by reinvesting it in the business so as to develop and expand. You will find that it is necessary to sell

Mr. E. V. Buchanan, London

---

*General Manager the Public Utilities Commission, London, Ont., [illegible] some new appliance such as a refrigerating machine machine at cost so as to popularize the article and gain the confidence of the consumer, and this service will take away some of the profit derived from the standard lines, and the contractor dealer in your town will soon come to thank you for this missionary work. The first electric stove that came to London cost $500.00. Four years later dealers were selling stoves just as serviceable for $75.00 each. Would they have been doing so had it not been for the enterprise of the municipal department? Another case in point is that of vacuum cleaners, which were originally sold in London by a coal dealer at $110.00, and some time later the Hydro Shop was selling better cleaners for $35.00.

All of the preceding should demonstrate that the activities of Hydro Shops are making electrical appliances available for the wife of the working man, whereas only recently they were looked on as luxuries for the millionaire.

Choose a Good Location

Once you have decided that you will operate an appliance shop, choose a good location and then get a bright, attractive and up-to-date store. The London Hydro Shop started business in 1911 upstairs in a back office in the old City Hall. Little business was done, but there was enough to justify a move into a small store fronting on a back street. The next move was to the main thoroughfare in an old and dilapidated building which stood on the site of the present shop. While the new building was in course of erection another move was made a few doors on the same street further down town and to a better store, and finally business was re-established on the old site in the new building. Every move, as a chart will show, resulted in a large increase in the volume of business.

When the store is actually opened for business, the foremost thing that should be borne in mind is that you are not merely selling watts or goods, but that you are selling "Service." Make your customer comfortable and at home. The London Hydro Shop provides lots of chairs and benches. There is a cosy corner with wicker chairs and table. Magazines are there. The telephone is handy. Downstairs in an inconspicuous corner is a ladies' toilet completely equipped, even including shoe polish and brushes. The clerks have neat engraved business cards with their names thereon. Should a customer go away without purchasing, he receives the clerk's card, and so it is easier for him to come back and start in on the deal where he left off by asking for the same clerk. The clerk, on the other hand, does not allow the customer to leave without getting his name and address. A story was told the other day of a business man from New York who travelled through Ontario and visited many of the electrical stores to see how they were conducted. He says that in the London Hydro Shop as usual he commenced a conversation about a washing machine. The clerk soon obtained the information that the party was from out of town and that he intended to come and live in the city. On inquiry, the stranger informed the clerk that it was almost impossible to find a suitable house and that he would likely live in a hotel and could not make use of a machine. The clerk, however persisted by suggesting that he might be of some service obtaining a house for him, and asked if he would not give his name and address. The stranger finally consented, and stated afterwards that this was the first time he had found a clerk who had earned the right to receive his name.

Salesmanship

A good salesman will not allow a prospective customer to leave the store until he is sure that it is impossible to conclude the sale. An example was observed some time ago when a man and his wife were examining electric ranges in the Hydro Shop and were satisfied on every point except that they were not sure the range which they liked would fit the space available in their kitchen. The salesman immediately suggested that the customers jump in his car and drive out to their residence and measure the space. This was done, when it was found that there was enough room, and the contract was completed. Had the customers been allowed to go without buying, it is possible that interest may have been lost or that some influence may have been brought to bear so that they would not have returned.

When a sale has been made, it is of the greatest importance that goods should be properly packed and wrapped before being delivered. The manufacturer of electrical goods is alive to the value of neat packages, and most appliances come in strong cartons. Every shop should have a handy and practical paper holder, and cotton ribbon with the name "Hydro Shop" stamped on is splendid material for tieing packages. Paper bags are ideal for lamps and small articles. These should have the imprint of the Hydro Shop. Next a customer should never be asked to take any article that he cannot easily carry, and if the business is small, a boy with a bicycle will make most of the smaller deliveries, while the larger articles may be delivered by the service waggon or truck at odd times. Business in even small places will soon grow so that it will be profitable to keep a truck solely for deliveries. This truck will also be found a great aid in making sales. The author was told the other day by a lady that her attention was caught by a washing machine advertisement, and as the telephone number was prominent, she called up for further information merely from curiosity, and before leaving the line had been asked for her name and address. She was greatly surprised in the course of twenty minutes to see a truck at the door with a machine which was immediately installed for a trial, and needless to say, remained there.

Everybody Helps

The message boy and the truck driver should be trained as salesmen and should have some mechanical skill so that on delivery they may be able to tell the purchaser more about the appliance if so desired, and should be able to make proper connections, change plugs, receptacles and fuses. An example of how sales may be made in this way occurred when a man was sent to rectify some trouble a customer was having due to the blowing of fuses by placing a two kilowat heater on 10 ampere fuses. When the Hydro man arrived the consumer had destroyed about a dollar's worth of fuses and was using language not to be found in the dictionary. After explaining the cause of the trouble, the Hydro man suggested that heavier circuits be wired in and that at the same time a stove be purchased, and an order was obtained there and then, but not before some highly colored remarks had been passed on the nerve of the salesman.

Display Your Goods Properly

All articles for sale should be well displayed. Tables about 5 ft. by 2 ft. 6 in. are very suitable for this purpose, as they can be rearranged from time to time, giving the store a new appearance and thus creating a fresh interest. Every article ought to be ticketed, giving the selling price, and also in code the cost price. Some time ago the author overheard one lady remark to another as they were leaving the store: "There are a whole lot of appliances I should like to buy in that shop, only I cannot get any satisfaction as the clerk does not seem to know the prices." It is impossible for a clerk to remember the price of every article where a large variety is kept in stock, but another good reason for ticketing goods is that it inspires confidence in the purchaser that there is one price for all. This policy should be rigidly maintained, although in this case, as in all others, the rule has to be broken under special sircumstances. Another good plan to adopt is to have a standard schedule of discounts for employees. A discount of about 10% from the ordinary retail price is about an average, but on some articles a larger discount may be given, while on others it is not possible to allow so much. It is well to encourage employees to purchase electric appliances. Satisfied employees are naturally good advertisers for the institution for which they work, and if they are at the same time users of the merchandise sold, they will be in a position to give more force to their selling arguments.

Sell on Instalment Plan

The instalment 'plan for the sale of appliances should be used as much as possible. The London Hydro Shop has sold over 2,500 appliances on easy payments, ranging from three months to twelve months, and between three hundred and four hundred houses have been wired and paid for on the same basis. It is good policy, however, to obtain cash whenever possible, and the installment plan should only be suggested when it is seen that a sale cannot be made otherwise. In some cases installment payments should be refused altogether when the prospective customer is known to be financially unsound. The Light Department is useful as a guide to people who may be trusted. A consumer who has failed to obtain the prompt payment discount repeatedly on his light bill, is not a good party to offer installment plan contracts to. The initial payment should be always sufficient to cover any ordinary depreciation which might result during the period of the contract, about 25% of the retail price. Proper lien contracts should be prepared for all goods sold on the installment plan, similiar to those in use by piano and furniture dealers. These contract specify that the appliance purchased does not become the property of the customer until the last installment is paid. The house wiring contract is always signed by the owner of the house and is a lien on the property itself.

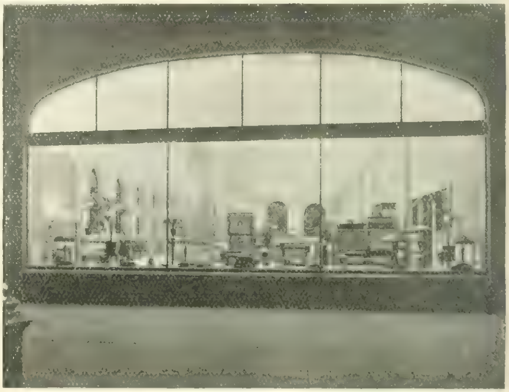
Seasonable campaigns should be conducted, and a good guide in this respect is to be obtained from the monthly bulletin issued by the Society for Electrical Development. The Hydro-Electric Commission is at present endeavoring to make some syndicate arrangements with the Society so that all the Hydro Shops may have the benefit of the service without becoming individual members of the Society. This Society has achieved wonderful results in one or two of their campaigns, such as, "America's Electrical Week," and also the campaign "Make This An Electrical Christmas." As business grows outside men should be employed to devote their whole time to the sale of one appliance. A man could easily be detailed for washing machines and another for vacuum cleaners, and a third for ranges. This policy has recently been adopted by the London Hydro Shop and has met with excellent results. A campaign for the sale of irons was run some years ago, when over one thousand irons were distributed in the homes of the city on a month's trial. The result was that 90% of these irons were sold and the total loss amounted to three or four irons. A similiar campaign is being devised at the present time for washing machines. The only reason for delay in launching this campaign is the uncertainty of deliiveries.

The Wiring Department

The Wiring Department is a great asset to any appliance sales department, as otherwise it is impossible to quote installed prices on appliances such as ranges and heaters. One of the greatest arguments for electric appliances is their portability, but as convenience outlets in the average house to-day are scarce, all this argument is destroyed. When appliances are delivered it should be noted if there are suitable places for connecting them, and if not, an offer should be made at once to wire the outlets necessary. The duty of an appliance department does not cease to a customer when the appliance has been delivered, and in this connection the London Hydro Shop maintains a vigorous inspection of the larger appliances sold. A man is constantly on the work of repairing and maintaining electric ranges. When he is called to make a repair in a district where there are several ranges located, he visits the other houses to see that the range is working satisfactorily. It is often found that where a gas range has not been discarded, it is being used almost altogether on account of the elements on the electric range having been burnt out, and failure by the maid to report the trouble to her mistress of the house. Washing machines and vacuum cleaners should also be inspected and oiled. When old appliances are discovered in disuse, offers should be made to allow a small sum in exchange for a new appliance. Even if the appliances are worth not more than scrap, it is good policy to allow an amount equal to the gross profit on the new appliance purchased. The electrical department obtains benefit from the increased consumption, while the sales department will increase its reputation for service.

Cost of Advertising

Advertising is a very important matter, but it is difficult to arrive at any definite rules and expenditures for the means of promoting business. The London Hydro Shop spends from 4% to 5% of the gross sales. The major portion of this is spent in news-paper advertising, but considerable is devoted to bill-boards. At the present time there are in use in London six painted bill-boards as well as several hand-painted posters, photographs of which are available. These posters are a new departure which was tried for the first time this Christmas. They were obtained for $10.00 each per month, and are 25 feet by 10 feet, and is one of the most inexpensive forms of advertising. The little magazine called the "Live Wire" published by the department, copies of which are available at this meeting, is but another means of preaching the gospel in an effectiive manner, and apart from the appliance sales department, this organ has other good features, such as keeping the public informed of the activities of some of its municipal departments. The chief reason for criticism of public institutions is lack of reliable knowledge by the public of the doings of these institutions. Items regarding the employees tend to develop a better spirit amongst workers, which in these days of



A fine example of display window—London Hydro Electric System unrest is invaluable. In some of the larger cities it has been the practice to permit banks and stores to collect light bills, but when a Hydro Shop is being operated, it is a good plan to have all bills payable at the main office where consumers must pass through the store in order to reach the wickets. In this way the great majority of the citizens will visit the Hydro Shop once a month. Lots of publicity can be obtained free from the newspapers if some tact is used. The reporters are eager to get electric stories, but, of course, are instructed not to use anything that appears to be advertising matter, but with a little ingenuity it is possible to give something which looks like a good news story, and whch has considerable advertising value at the same time. No opportunities should be lost in replying to any articles that appear in the newspapers and are written with the intention of discrediting the department. In this way many a knock may be turned into a boost. An example in the case of a letter which appeared a few weeks ago in the London "Free Press" criticising the Hydro Shop. This was a first class opportunity to have half a column advertising the Shop gratis, and a letter was immediately written in reply to the critic. Another news story appeared regarding unsatisfactory voltage conditions in the city causing the burning out of lamps. This was immediately followed by an advertisement for the fifteen-hundred-hour guaranteed Hydro Quality lamps.

The London Hydro Shop at the present time is losing no opportunity of interesting the medical men in heating pads, and there are three or four dealers who are known to have been the direct means of making many sales.

In connection with the sale of lamps, it has been possible to offset to a great extent the activities of the grip-sacker with his cheap lamp, by establishing agencies for Hydro Quality lamps in corner grocery stores, and at the same time rendering a further service to our customers.

A tremendous amount of work can be done in educating the people through the medium of clubs and other organizations. The author has addressed the Rotary Club and the Y.M.C.A. on electric appliances, and a series of talks has now been arranged before the Mothers' Clubs of the city. Circular letters have been sent to the architects regarding convenience outlets, and moving picture films have been shown in the theatres. The latter has been proved to produce direct results. Following the exhibition of a picture in the local theatre, several percolators and toasters of a type portrayed by the film were sold in the next few days.

Local Fairs should be taken advantage of for exhibition purposes, and displays should be made. It will be found that appliances will be sold at these Fairs not only to town people, but to visitors from other places. Apart from the sales actually made, conversations with interested spectators will be a means of securing a list of prospective customers. The London department had in view the running of an electrical exhibition some time in January or February during the quiet season, had the power conditions made it advisable. The idea in this case would be to secure the hall and invite all the local contractor dealers and Canadian manufacturers to erect booths. There is no doubt that such an exhibition could be conducted at practically no expense to the department, as a small admission might be charged, and this, together with the rental of the space, would cover all expense.

Electric Ranges

The sale of electric ranges can best be promoted by actual cooking demonstrations, and with this end in view when erecting the new building, the London Public Utilities Commission, installed a model dining-room and kitchen where meals are served to parties of ladies interested in electric ranges. Quite a number of meals have been served in this way, and the demonstrator states that about 90% of all those entertained have become purchasers of stoves. Records of customers, together with their average monthly bill, is particularly good in the case of range sales, as a customer is often doubtful if there will be any direct economy from the use of a range. If it can be shown that here is Jones and Smith and Brown with a family of five, the same as our customer, who each have an average bill of $2.50 per month, he will be convinced as in no other way.

To much emphasis cannot be laid in the handling of only high-class material. Everything sold by a Hydro Shop should be of the very best quality, and no inferior goods should be handled simply because there is an opportunity to make large profits. The dignity of the job of selling electric appliances should be maintained. Only a salesman of first-class appearance should be employed. He should be provided with a business card properly engraved, and there is no question but that he will receive very much better attention than were he of the low-class type of pedlar who is so often seen going from house to house. The public are naturally afraid of being exploited, but with the name "Hydro" to start with, and the reputation maintained for ethical methods of conducting business and excellent service, there should be no limit to the extent of sales.

Although there is much work still to be done in the field of domestic appliances, there is a branch which has not as yet been introduced by the Hydro Shops. This branch includes commercial electrical appliances. The London Hydro Shop recently sold during a tailors' strike, sewing machine motors and tailor's irons to 50% of the tailors in town. A large number of barbers have been canvassed and sold electric hair cutting machines, and at the same time vibrators were sold to those who did not already have this appliance. A stock has just been put in of electric drills, although to some extent luxuries and not current consuming grinders, etc. Another of the more recent lines which has had good results is the portable art lamp. These lamps devices, are necessary for the beautification of the home to such an extent that we believe our customers ought to purchase them. At the same time they decorate and enhance a store wonderfully, and in this way aid the sales of other appliances. Again the margin of profit is greater on these articles and with judicous handling they may be made to pay more than their share of the overhead expenses, thus enabling other more practical appliances to be sold nearer to cost price. For this reason also, the sale of side lines, such as flash-lights, cooking utensils, including kettles and porridge boilers, casseroles, etc., is a good thing.

Sales Records

Finally, proper records of sales should be kept. Daily reports showing the number and value of all classes of goods sold should be recorded and totalled for the week, together with a comparison of the sales made in the previous week. Perpetual records should be maintained by means of stock cards, and monthly financial statements should be issued, always showing the preceding months of the year for the sake of comparison.

The program set forth above may seem too elaborate for smaller towns, but there is little suggested that cannot be applied in some way or other even to the smallest places. A scheme of co-operation might be worked out for the smaller places with the larger centre in their vicinity.

In conclusion, apologies should be offered for setting forth the above policies as correct methods of merchandising, but in explanation be it said that they are given only because they have been tried and results following have been good. How much of the good results is due to these policies is not known, but it is hoped that the discussion following the paper may correct any wrong impressions which have been given.

One view of the handsome interior of Burnham and Friths, Edmonton, Alberta. Note the carefully arranged show cases. The appliances are kept where the public can see them and ask questions about them.

Canada's Electric Stores Are Showing Great Improvement—Study the Photos on these pages

The photographs on these pages are reproductions of the exterior and interior of the electric store of Burnham and Frith, Edmonton. They indicate clearly enough that the "West" has caught the proper spirit of merchandising and that in this, as in other things, when they decide out there that a thing is worth doing at all, it is worth the very best effort they are capable of. Such windows and such splendid interiors, reminding one almost of a Ryrie or a Birks display, should be an inspiration to contractor-dealers everywhere and an encouragement to the whole industry as pointing out not only the possibilities of the future of electrical merchandising but also the reasonable assurance that in the near future the electric retail trade will have merged from its condition of chaos and obscurity of the past and have taken its place among the most attractive and most efficiently operated of all the various lines of retailing.

Of course, the fight is only well begun, but who can doubt, looking at these pictures, that we are going strong? At least we have advanced so far that we now have numerous practical examples of fine merchandising methods where formerly we had only theory—and examples go a long way. Comparisons which show "odious contrasts" are having their effect and it is quite safe to say that the general standard of show windows and interior arrangements and selling methods is materially better today than it was five years ago or even one year ago.

The assistance given by various manufacturing and jobbing houses has, of course, been of the greatest help to contractor-dealers whose chief experience (and chief interest as well) had, until very recently, centered around the purely contracting end of the business. Some of these men perhaps had no sympathy with the merchandising of electrical goods, but many more who had the sympathy and the right inclinations had not the special sort of knowledge that they required to make the store business a success. Much of this knowledge and much of the necessary material for mak-

You judge a store by its windows, just as you do a man by his face. If a man's face is bright and clean and attractive you like the man and want to cultivate further acquaintance. There is no more valuable member of your staff than your "window." You have to pay it wages—see that it brings you results.

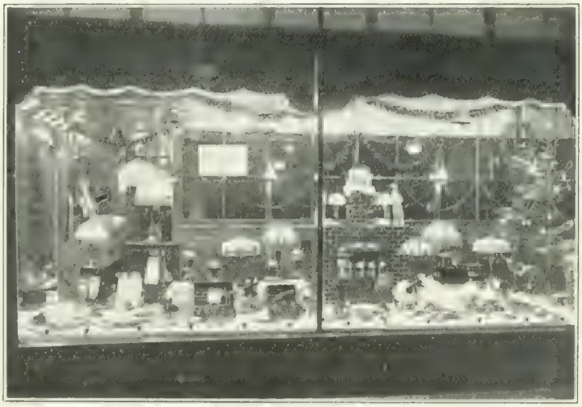
People like to "Shop round" That is one reason of the popularity of the department store—you can look without being molested. This store has a very varied display which enables the customer to move around and improve his knowledge of electrical goods, without any assistance from the proprietor or salesman.

ing up attractive windows and interiors is now being provided and beneficial results are very evident. Many manufacturing and jobbing companies supply, gratis, advertising matter, display cards, and so on, and one company at least is providing an expert merchandiser and window dresser who is at the disposal of contractor-dealers on request. It would surely be a splendid big step forward if the manufacturers' association and the jobbers' association could combine and organize this phase of electrical merchandising on a co-operative basis. Such an organization could keep, not one, but many, skilled men very profitably employed in raising the standard of retailing. The results may not be evident just tomorrow, but in a matter of a few months the retailers would become so well versed in this art, which is now a good deal of a mystery to them, that the old standard of doing things could never return.

There is no longer any excuse for an unattractive window, any more than there is for a salesman having an unattractive appearance. What would be thought to-day of a man, making application for a new position, who did not pay special attention to his appearance and his address. He is trying to sell his services exactly as the dealer is trying to sell his appliances, and there is just as much reason why the dealer should do his utmost to impress his customer favorably.

A splendid paper by Mr. Buchanan, of London, is reproduced elsewhere in this issue on the subject of merchandising. Mr. Buchanan's window displays are a fine example of what the contractor-dealer should strive for. Mr. Buchanan speaks in this paper of the value of timely advertising and window displays and instances the fact that during a tailors' strike in his city they sold sewing machine motors and tailors' irons to fifty per cent. of the tailors in town.

Regarding display, Mr. Buchanan urges that all articles should be well displayed, and recommends tables about 5 ft. by 2 ft. 6 in., which can be rearranged from time to time and so give the store a new appearance. He also states that every article should be ticketed—the price marked in the plainest possible way.



And don't forget that the window that is not changed frequently becomes like an expressionless face. Don't you like to watch a face that changes its expression constantly? Well, that's what the public look for in your windows. The figure on the right shows a most attractive Christmas window.

The Cost of Electric Servants

By Grace T. Hadley

Last spring the wife of a well-known writer sought to solve her servant problem by importing three colored workers from the sunny South. She paid their fares to her home; then, finding them deficient in many things they should know, she paid to have them instructed in housewifery. After working for her about six months, they departed, cook, maid, laundress, one after the other, leaving their mistress entirely without help.

She promptly called the Bureau for Household Help, but, alas, there was no help for her or for any one. "My dear Mrs. W——," exclaimed the manager, "I have a dozen places to one cook."

"If I had only a laundress," wailed the voice at the other end of the wire, "I might manage somehow—"

"I can not even send you a laundress for the present. Hen's teeth are plentiful compared with a good laundress in this community."

The next day the lady met an old acquaintance at the bank and into the sympathetic ears of Mrs. S——, she poured the tale of domestic service woes. Mrs. S—— conducts an efficiency kitchen and demonstration tea-room in the community, but she was well posted about all new appliances.

"Of course," said Mrs. W——, "I know you specialize in foods, but could you not come out to my house and talk to me and my friends about labor-saving appliances for the home? As long as we had servants to do all of our work, we let them do it, and did not bother our heads much about the labor-savers, but now when we have to do the work ourselves, why, that's a different story. Come and tell us how to make it easier."

When Mrs. S—— appeared before the dozen ladies assembled at Mrs. W——'s home, she had prepared facts and figures about the cost of modern equipment and the cost of servants.

"Of course, I know that none of you is anxious to do your own work, but, in these days of the increasingly difficult servant problem, many of you are being forced to do it.

"I am going to try to show you what equipment in the home will cost and how it helps to diminish the cost of living.

"Consider, please, the case of Mrs. W——, who imported three helpers from the South. Allow $100 for their railroad fare and $50 for their tuition after they arrived. Then the salary of the cook, $50, plus $45 for the maid, plus $30 for the helper; include $75 for the board of three persons and $25 for wastage, and you have a total of $225. For six months this would amount to $1,350, plus the railroad and tuition, $1,500. This was the cost of three servants to Mrs. W—— in six months."

Suppose Mrs. W—— were to invest largely in modern equipment for her home, it might run something like this:

Electric Refrigerator	$350
Electric Range	150
Electric Washer	165
Electric Ironer	160
Laundry Irons (2)	12
Vacuum Cleaner	50
Small Sewing Motor	21
Dish-washer	200
Electric Fans (Several)	50
Extra Wiring	75
Total	$1,233
Interest on the investment at 6 per cent. would be about	$74

There is one important point to be remembered right here, and that is that after the equipment is once purchased and installed it is ready for years of service with only a small outlay for repairs, insignificant beside the continual up-keep of, say, three servants.

"Have you any definite comparisons to give us regarding cost of equipment and one helper?" inquired Mrs. W——.

"Yes," said Mrs. S—— with conviction, "here are the facts about a family of five who, unable to obtain a reliable laundress, invested in an electric washer and ironer."

She then made a comparative statement of the actual cash cost of equipment vs. the laundress. See table at bottom of article.

Comparing the figures below it will be seen that the washer and ironing devices pay for themselves in fourteen months. They are great savers of time and strength to the housekeeper who has to do her own work.

"Well, all this is very interesting," remarked a recent bride, "but I frankly admit that my husband is getting only a moderate salary and that we can not invest heavily in such equipment, much as I would like it."

"Now, then," continued Mrs. S——, "I want to tell you about a plan for financing electrical purchases for the home, a plan so simple, easy, and dignified that the young people who are just starting housekeeping may avail themselves of such equipment as they may need at the outset.

"This plan places at your command a businesslike and economical method of purchasing household labor-savers by making a comparatively small cash payment and a number of monthly payments. You may ask, 'How does this differ from the usual instalment plan of buying house furnishings?' A merchant selling household goods on such a plan usually adds quite a bit to the selling price of his merchandise and one generally pays more in the end than when paying cash.

Under the plan I refer to you can buy necessary electrical equipment for your home at the cash price in easy payments with a small sum down, plus a modest charge to cover interest and insurance on the equipment. This is just a plain everyday business transaction. In fact, it is exactly what big companies often have to do in order to finance their affairs.

"Suppose that a firm sees the necessity of installing modern electrical equipment in its factory. This may require some outlay of capital which the firm may not have in reserve. It is therefore necessary to go to a bank to borrow money in order to finance the purchases. The bank after assuring itself of the borrower's standing and ability to pay, advances the money, taking a note bearing a promise to pay within a stated time, and charges interest for the use of the money. With some slight modifications this is what happens if you avail yourself of the services of the new plan.

"You make a small initial payment. Delivery is made at once to your home of the cleaner, washer, portable sewing-machine, dish-washer, or other appliance. At the time you make the first payment you sign what is known as a retail trade acceptance for the unpaid balance. You also sign a lien agreement whereby the company retains title to the appliances until the trade acceptance has been fully paid for.

"Having made your initial payment and signed the trade acceptance and lien agreement, you make your monthly payments direct to a certain designated bank in a manner most convenient to you, by check, mail order, express order, or in person. When all payments have been made the trade acceptance and lien agreement are cancelled and returned to you. The appliances are entirely yours and, best of all, the payments have been made without any strain on the silken purse."

Cost of Laundress vs. Electrical Equipment

Cost with laundress:	
Laundress	$ 2.50
Car-fare	.10
Luncheon	.40
Cost per day	$ 3.00
Two days a week	6.00
Laundress 52 weeks per year	$312.00
Three cakes of soap per week for 52 weeks	12.48
Gas or coal	10.00
	$334.48
Cost with electrical equipment	90.83
Yearly saving of electrically operated equipment without laundress	$234.65
Cost of equipment:	
Washer	$165.00
Ironer	100.00
Electric iron	6.00
Total	$331.00
Operation per week:	
Electricity	.19
Soap	.15
Gas	.05
Oil	.02
Total per week	$ .41
For year	21.32
Interest at 6 per cent. on investment of $331.00	19.86
15 per cent. depreciation	49.65
	$ 69.51
Electricity, Gas, Soap, etc.	21.32
	$ 90.83

Tips for the Store Salesman*

The time has passed when slip-shod, easy-going, careless methods can be tolerated in any retail store which would succeed. Not only is competition growing keener but the buying public is coming to expect better selling service. (This is partly because a great many people nowadays know how merchandise should be sold.)

Nevertheless, one can hardly enter even the better lass of stores without meeting something which "rubs the wrong way"—which, unconsciously perhaps, leaves a little seed of dissatisfaction.

In line with suggestions in recent issues of the Sales Service the observance of the following pointers by retail salesmen will go a long way toward making their store a more popular place in which to buy:

Greet the customer with a smile and then give your undivided attention to supplying her wants.

Answer questions truthfully. If you are not sure MAKE sure rather than risk giving inaccurate information.

Show the customer what is asked for quickly; if the customer is not sure WHAT she wants, show SOMETHING as promptly as possible—it will at least be a starter and may help you in finding out just what WILL suit her.

Never correct a customer if she calls an appliance by a wrong name; neither should you venture to correct her pronounciation. Listen to the customer's troubles, but don't tell them yours.

Don't criticize your competitor's goods.

Don't try to talk to or wait on more than one thing for the customer, the sale is more than one person at a time. Avoid all unnecessary conversation with other employees while waiting on a customer.

If you see a customer carefully examining an electric percolator, don't breeze up to her and say "Something in percolators, madam?"

How much better it sounds to say, "Is there any information I can give you about electrical appliances." or "Can I be of any service?"

Women, in particular, like to "shop around." Because a woman enters a store it is no sign that she has any idea of buying. Perhaps you can put the buying idea into a "shopper's" mind; if you try to DRIVE it in you are liable to drive HER out.

Show just as much respect to the customer who wants something less expensive than you carry, as you would to the cash buyer of an electric range.

Many sales are made by auto-suggestion, which simply means that if you KNOW the appliance which you are trying to sell is the best half made.

If you don't believe in what you are selling or in your employer, better look for something else to do.

Learn all you can about the appliances you are selling, how they are made, what materials enter into their construction, why they cost what they do, etc.

Keep up-to-date on all electrical matters. Do not let a customer know more about some electrical device than you yourself know. Read the manufacturers' catalogs, booklets and their ads in the National Magazines.

Small Heater For Shoe Factories

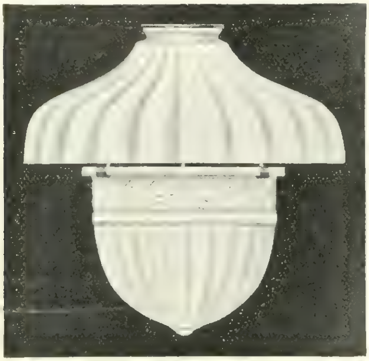
The illustration herewith shows the "Unitize" heater manufactured by the Safety Utility Economy Company, Boston, Mass., for use in shoe factories in heating edge irons, treeing irons, smoothing irons or any other small tools. It is pointed out that one of the advantages of electric heat in the factory is the reduction of fire hazard. Another advantage of a heater of this kind is the fact that it can be moved around and used wherever required. Furthermore, the cost of operation is low and the tools are never overheated. The same company also make a special duty stove for heating flat irons, smoothing irons or liquids in containers; a dryer which has a capacity of 24 pairs; a dry heat box toe heater; a heater for the Niggerhead laster and a heater for the flat bed laster.

---

*Courtesy Society for Electrical Development

The "Sunlight" Unit

A new lighting unit that has been having a very cordial reception during the past few weeks in Canada is that manufactured by the Sunlight Electric Company of Detroit and illustrated herewith. This unit is being handled by Benson & Wilcox, of London, and by the Central Electrical Supply Company, Limited, Toronto. Benson & Wilcox report that they sold 23 dozen during the first two days, and Mr. Pearce, of the Central Electric, states that his first day's bag was 1,100. Mr. J. S. Smith, manager of the Sunlight Electric Company, has been visiting Canada for a few days and is very pleased with the success this unit has met. An important feature of the unit is that it is very easily installed and at no additional expense; all that is necessary is to remove the present shade and attach the Sunlight unit. The Sunlight is made in only one size as yet, but accommodates anything from 75 up to 200 watts. The glassware is the well-known Moonstone, which gives a beautiful, diffused effect. It is evident that this unit is suitable for practically any type of indoor lighting from factory and warehouse to the private home.



Big C.G.E. Supply Catalogue

C. G. E. Electrical Supplies—The Canadian General Electric Company have compiled Catalogue No. 20 for 1920-21 which, in conjunction with the recently published Catalogue No. 19 on automobile supplies, furnishes a complete, up-to-date revision of C.G.E. supply materials. The matter has been carefully arranged and indexed and is a very complete and reliable guide of 1192 pages on electrical supplies and fittings of all kinds. The catalogue also includes a number of valuable tables and useful information, as well as an index to descriptive bulletins and sheets published by the company.

New Publication on Underfeed Stokers

The "Westinghouse Underfeed Stoker" is the title of a 36-page, 8-½ by 11 inch booklet, with an attractive 3 color cover, just issued by the Westinghouse Electric & Manufacturing Company of East Pittsburgh, Penna. Under the head of "Details of Construction," the booklet gives a comprehensive description of the leading features of design contributing to the efficiency and reliability of operation. The interconnection of grates and tuyeres and the arrangement of brackets, gears and fuel deflecting plates, are clearly described. Taking up the principles of operation, the circular explains, by use of sectional cuts and charts, the distinctive features of the zone system of air distribution. The subjects of "Efficiency" and "Capacity" are taken up together with "Flexibility," curves setting forth extensive performance data relative to these subjects and others are used to amplify the text. Under the subjects of "The 'Coal Saving' Problem" and "Fuel Burning Equipment of Modern Power Stations," an interesting and instructive array of information is given for the benefit of those who have the operation of stokers in charge. A large list of representative installations making use of these stokers is another prominent feature. The printed matter is illustrated throughout.

The winners of the Best Window Contest will be announced in our Feb. 1st issue.

Supplying the Farm

The Delta Star Electric Company have issued an interesting bulletin, No. 35, entitled "High Tension Outdoor Unit Type Farm Power and Lighting Equipment." This bulletin shows how the farm may be supplied with light and power from high tension transmission lines.

New Inspection Rulings

Toronto, Ont., Dec. 27th, 1919

To The Trade:—

Kindly take notice that after January 1st, 1920, approved single braided rubber covered wire, in sizes from No. 14 to No. 8 inclusive, may be drawn into service pipes and conduit systems where the difference of potential between any two wires of the system or between any wire and ground does not exceed 650 volts. Such wire, however, must comply with all other requirements governing conduit work and in sizes of No. 6 B & S gauge and larger must be double braided.

We also take this opportunity of advising that in 3-wire direct current and single phase systems, the fuses must be omitted from the neutral wires and the neutrals of all such systems, as required by Rule "E," Page 27, and an approved 3-pole service switch, provided with fuses on the outer legs only and having the neutral fuse gap bridged solid, must be installed at the point of service entrance and arranged to cut off the entire current from the circuits which they control, as required by Rule "E," Page 50, 6th Edition of the Rules and Regulations.

The use of open knife switch panels, from which persons could receive a shock, is contrary to the Rules of the Commission. There are now on the market a number of approved safety panels having no exposed live current carrying parts. This form of panel must be adopted.

The change in the rule permitting the use of single braided wire will not, of course, prohibit the use of double braided wire in all sizes. The other rules referred to have not so far been rigidly enforced, but with a view of adding further to the safety of the installation, must in future be strictly complied with.

Electrical Inspection Department,
District of Toronto.
A. G. HALL, District Inspector.

The Marchand Electrical Company, of Ottawa, have been awarded the contract for the reconstruction of the Pembroke Electric Light Company's transmission line from Pembroke to Black River; the erection of a White Way on Pembroke Street with underground wiring; the removing of all poles and overhead wires on Pembroke Street, and the re-arrangement of all the overhead lines in the town.

Current News and Notes

Alexandria, Ont.

The Hydro Radial By-law carried in Alexandria, Ont., by a majority of 142.

Beamsville, Ont.

Fire destroyed the car barns of the Hamilton, Grimsby and Beamsville Electric Railway at Beamsville, Ont. Three passenger cars were also destroyed.

Belleville, Ont.

Multiple Electric Products Company, Inc., a corporation created in the State of New York, has been granted an Ontario charter and will have their head office in Belleville, Ont. The capital stock of the company is said to be $250,000.

Capreol, Ont.

The ratepayers of Capreol, Ont., will vote on an expenditure of $20,000 for the purpose of establishing and constructing an electric lighting system in the town.

Chatham, Ont.

A petition is being circulated for a Hydro line from Chatham to Kent Bridge along the river road and adjoining side roads. It is expected that farmers along the route will give the proposal their support.

Chilliwack, B. C.

The Chilliwack Telephone Company will install a modern switchboard in their exchange. This is necessitated by the rapid growth of the business.

Cornwall, Ont.

The Canadian Cottons, Limited, Cornwall, Ont., will construct a new hydro-electric power house in Cornwall, Ont., immediately west of their Stormont Mill. The power house will contain three vertical shaft units of 1,000 k.w. capacity. Mr. R. S. Kelsch, of Montreal, is the company's consulting engineer.

The Canadian Cottons, Limited, Cornwall, Ont., contemplate increasing the capacity of their new steam turbo-generator plant, by adding a new unit consisting of water tube boilers, steam turbine and the necessary auxiliaries. Mr. R. S. Kelsch, of Montreal, is the consulting engineer.

Dundas, Ont.

The ratepayers of Dundas, Ont., passed the Hydro Radial By-law with a substantial majority.

Elk Lake, Ont.

The plant of the South Bay Power Company on Hanging stone River, near Elk Lake, is nearing completion and, it is said, will be in part operation by July next. The capacity of the plant is estimated at 2,000 h.p. and the power will be used largely in the Gowganda mining district. Mr. T. A. Wood is manager of the company.

Elmira, Ont.

The ratepayers of Elmira, Ont., carried the Hydro-Radial By-law.

Fergus, Ont.

The town council of Fergus, Ont., have under consideration extensions to the Hydro system.

Fredericton, N. B.

The New Brunswick Telephone Company will shortly take over the lines of the York and Carleton Telephone Company, Carleton, N. B.

Galt, Ont.

The ratepayers of Galt, Ont., voted strongly in favor of the Hydro Radial By-law showing a 14 to 1 majority.

Guelph, Ont.

The city of Guelph, Ont., by a large majority, carried the by-law to issue debentures to the amount of $855,235, as their share of the Hydro Radial line from Hamilton to Guelph.

Guelph, Ont.

By a vote of about 5 to 1, the city of Guelph voted to sell the Guelph Radial Railway to the Hydro Commission. The road will thus become a part of the provincial radial scheme. The price to be paid is $150,000.

Hamilton, Ont.

The Hydro-Radial By-law, guaranteeing $630,000 for a line from Hamilton to Guelph was carried by Hamilton ratepayers with a vote of 2,804 to 855.

Mr. F. Hunt, electrical contractor, recently opened a store at 52 Barton Street East, Hamilton, Ont., and has an up-to-date stock of fixtures and electrical supplies.

The Ontario Mills, Hamilton, Ont., are making arrangements to build and equip a new steam boiler plant of 12,000 h.p. capacity, to take the place of the existing boiler plant. The new plant will be modern in every respect and will be equipped with water tube boilers, coal and ash handling equipment, heaters, pumps, piping, etc. Mr. R. S. Kelsch, of Montreal, is the consulting engineer.

Kitchener, Ont.

The ratepayers of Kitchener, Ont., carried the Hydro Radial By-law with a majority of 767.

Kingston, Ont.

It is announced that Hydro rates will be lowered in Kingston this year. Mr. R. F. Elliot has been re-elected chairman of the Public Utilities Commission.

Kirkfield, Ont.

Estimates have been submitted by the Ontario Hydro Commission in connection with supplying light and power to Kirkfield, Ont., and to the plant of Crushed Stone, Limited. About 150 h.p. is involved.

London, Ont.

The ratepayers of London voted, by a small majority, against increasing the street railway fare.

Magog, Que.

The Dominion Textile Company are building a new dam for power development in connection with their large mills at Magog, Que.; two 1500 k.w. units will be installed. Mr. R. S. Kelsch, of Montreal, is the consulting engineer.

Marysville, N. B.

The Canadian Cottons, Limited, have plans prepared and are receiving tenders for a new 5,000 kw. steam turbo-generator with the necessary switchboards, motors, etc., to operate their cotton mills at this place. Mr. R. S. Kelsch, of Montreal, is the company's consulting engineer.

Meaford, Ont.

The ratepayers of Meaford, Ont., carried, by a substantial majority, the Hydro enabling by-law.

Milltown, N. B.

The Canadian Cottons, Limited, will construct a new dam and hydro-electric power house, containing three vertical units. The plant is to be used to operate the cotton mills, replacing their existing hydro-electric plant. Mr. R. S. Kelsch, of Montreal, is the consulting engineer.

Moncton, N. B.

A disastrous fire at Moncton, N. B., destroyed the car barns, machine shop and part of a large brick building of the Moncton Tramways, Electricity and Gas Company, together with considerable machinery, one street car and a street sweeper.

Montreal, Que.

Letters patent have been granted to Scientific Experimenter, Limited, with a capital stock of $100,000, to manufacture and deal in all kinds of amateur and experimental wireless telegraph, telephone apparatus and accessories, electrical toys, scientific apparatus, etc. The head office is at Montreal.

New Westminster, B. C.

MacKenzie & Company, tinsmith and heating specialists, New Westminster, B. C., have installed a complete stock of electrical fixtures and supplies and will carry on an electrical contracting business. This will be in charge of Mr. R. D. MacKenzie, who recently returned from overseas where he was in the patrol service of the Navy.

Nokomis, Sask.

Work is nearing completion in connection with the construction of an electric lighting plant at Nokomis, Sask. Two engines and other equipment are being supplied by the Canadian Fairbanks Morse Company.

North Dumfries Township, Ont.

The ratepayers of North Dumfries Township, Ont., voted 80 to 65 in favor of the Hydro Radial By-law.

Norwood, Ont.

A Hydro enabling by-law has been passed by the ratepayers of Norwood, Ont.

Orillia, Ont.

Arrangements have been completed between the town of Orillia, Ont., and the Ontario Hydro Commission whereby the Hydro is to pay Orillia $750 per annum for the privilege of transmitting power over the town's lines from Wasdell's Falls to the Big Chute or vice versa. The Hydro also pays $10,000 for the line between the Big Chute and Swift Rapids together with interest on this sum for a year at six per cent. The town is relieved from the obligation to supply the Hydro Commission with 250 h.p., and it is provided that any power ordered by either party shall be paid for at a quarter of a cent a kilowatt hour. The agreement is to run for 15 years from the 1st of November, 1918.

Owen Sound, Ont.

Extensions are being made to the switchboard of the Bell Telephone branch at Owen Sound, Ont. There are now 2,000 lines and provision is being made for an additional one hundred.

Port Dover, Ont.

The ratepayers of Port Dover, Ont., carried the Hydro Radial By-law by a majority of 222.

Preston, Ont.

The Hydro Radial By-law was carried in Preston, Ont., by a vote of two to one.

Regina, Sask.

The Regina Railway revenue for the year 1919 totalled $300,940, an increase of 30 per cent. over the previous year.

Ripley, Ont.

A by-law will be submitted to the ratepayers of Ripley, Ont., in February, asking authority to spend $10,000 for Hydro power and light distribution.

Sarnia, Ont.

Officials of the Ontario Hydro Commission will compile a report on the Sarnia Street Railway with recommendations as to the advisability of its purchase by the city. Extensions and improvements are being planned if the deal goes through.

St. Jacobs, Ont.

Two hundred majority for the Hydro Radial by-law was polled by the ratepayers of St. Jacobs, Ont.

St. John, N. B.

The Cornwall & York Cotton Mills Company, Limited, St. John, N. B., are about to construct a new power house and engine room which will be equipped with water tube boilers, turbo-generator, switchboards, cooling pond, etc. Two units of 750 kw. capacity will be installed. Mr. R. S. Kelsch, of Montreal, is the company's consulting engineer.

Teeswater, Ont.

A Hydro enabling by-law has been passed by the ratepayers of Teeswater, Ont. Work of installing the necessary equipment will be carried out by the Ontario Commission.

Toronto, Ont.

Mr. F. A. Wiles, plumbing and heating contractor, 135 Avenue Road, Toronto, recently purchased an up-to-date stock of electric fixtures and supplies and is entering into the electrical contracting business.

The Toronto Railway Company's earnings for 1919 amounted to $7,175,167, an increase of $646,367 over 1918. The city's percentage for the year totalled $1,251,310. The increased earnings represent about 13,500,000 more fares than in 1918 although the carrying capacity was increased by only 20 trailers.

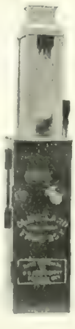
The Toronto civic car lines show an increase in revenue of $100,541 for the year 1919 over the previous year, the total revenue being $441,955.

By a majority of 21,705 to 2,821 the citizens of Toronto voted to take over the Toronto Railway System at the expiration of the franchise in 1921.

Letters patent have been granted to Ivey Storage Batteries, Limited, for the purpose of manufacturing aand dealing in electrical storage batteries and appliances of all kinds. The head office is in Toronto; capital stock $500,000 and provisional directors P. D. Ivey, A. Mutchmor Ivey, A. J. Salisbury, C. H. Ivey and R. G. Ivey.

Vancouver, B. C.

The city of Vancouver now has 33,887 telephones, compared with 26,752 a year ago. Victoria has 11,677 against 10,100; New Westminster 2,423 against 2,136; North Vancouver 1,242 against 1,068; West Vancouver has 129 against 88 a year ago, a gain of 46.6 per cent., the third highest increase in the area served by the B. C. Telephone Company on the lower mainland.



The Cleveland Fare Box
Prevents Mistakes

It is the one sure method of collecting fares without possibility of mistakes or losses in any way.

THE CLEVELAND FARE BOX is an important advancement in street car service to the public in safeguarding the interests of the municipality or company, etc., in saving time and labor.

Write for further important facts regarding this practical and valuable means of collecting fares.

M. C. McElligott, *Manufacturer*
PRESTON, CANADA

Agent for the Arthur Power Saving Recorder for Western Provinces
Canadian Representative, Universal Lubrication. Tulc.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - 119 Board of Trade Bldg.
WINNIPEG - Electric Ry. Chambers
VANCOUVER - Winch Building
NEW YORK - 309 Broadway
CHICAGO - 1413 Gt. Northern Bldg.
LONDON, ENG. - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, February 1, 1920 No. 3

Toronto Convention and Banquet a Good Business Stimulant

The electrical men of Ontario had a real big time during the week of January 16, which will stimulate the industry and especially the merchandising side of it to much greater accomplishment in the future. There seems to be only one fly in the ointment. Here we are all organized to the limit to place electrical appliances and apparatus in the hands of the general public and, right at the very start, we bump up against a shortage of power to operate these things after they are sold. As was reiterated so frequently during the convention period there is the greatest urgency in the Province of Ontario for all possible speed in the development of more hydro-electric power. We believe the Hydro Commission is well advised of this fact and are bending all their energies to get the Chippawa plant in operation at the earliest possible moment. There seems to be no possible doubt, however, that the increased demand from year to year will take care of the generated supply, even though the Hydro Commission plans at once to develop this power to the limit and carries the whole work to completion as soon as possible.

Perhaps there is no section of the Dominion where the supply of electrical current is so "oversold" as it is in Ontario. Montreal and the East seem to be on Easy Street in that the supply and demand are fairly balanced and conditions as regards further supply are such that it can be made quickly available as the demand develops. This may be due in [illegible] It may be that the demand has not been so intensively developed as in Ontario [illegible] carrying out their plans for development. In Winnipeg too, while the market for power has increased tremendously, those in charge of supply seem to be keeping well ahead of the game. In Vancouver they have, temporarily, reversed the conditions in Ontario and have quite a lot of power to spare, with plenty more easily available. Vancouver and the province of British Columbia generally seems to be at the present moment the most promising field in all Canada for a vigorous and intensive selling campaign in electrical household appliances and industrial apparatus and equipment of every sort.

Inspection Department Needs Both Moral and Legal Support

The statement made by Mr. Goodwin, regarding electrical inspection, in his Friday evening remarks, to the effect that such inspection was often made by men who knew less about the merits of the installation than the contractors themselves and, hence, that such inspection should be done away with, must be accepted as merely an indication that Mr. Goodwin has a keen sense of humor and was counting on his audience realizing that fact. To those who know him well enough to appreciate that he would not make such a statement seriously it is all right, but the danger is that unscrupulous contractors will make use of this statement to bolster up their opposition tactics—which have already caused the inspectors a great deal of unnecessary trouble. The need for inspection will have disappeared only when all those who make the installations are both thoroughly efficient and scrupulously honest—a condition not yet reached in the industry or likely to be reached in the near future.

In our opinion the one real criticism that can always be made of the Ontario Hydro Inspection Department is that it is still called "Hydro." It is a case where an organization is inspecting itself. Fortunately, it is presided over by a man who has the confidence of the entire industry. However, the name "Hydro" remains and the moral effect is a tendency to create distrust on account of the ambiguous position the members of the inspection department are placed in. The real solution, (we have said so before), still seems to lie in the entire separation of the Inspection Department from the Ontario Commission control and, then, give ample power to the department to see that the installation rules are observed.

Labor Turnover Responsible for Most Accidents

Some interesting facts have just been brought to light from an analysis of several thousand accidents recently reported by manufacturers, chiefly electrical, in the United States and none is more striking than this: that the highest percentage of accidents occurred among those who had been in the employ of the companies the shortest period of time. Of all the accidents reported, 25.9 per cent., or the highest single percentage, had all been in the employ of the companies less than six months. On the other hand the veterans of over 20 years' service contributed only 1.1 per cent. to the casualty list.

Here is another good reason, and one that is generally overlooked, why employers should do everything in their power to reduce the tremendous labor turnover. The man who floats about from one firm to another and from one job to another always has a low efficiency average. When to that he adds the further expense and delay entailed by an unreasonably high hazard factor, the situation is still further aggravated. In the interests of efficiency and greater production it would seem that we must have a much greater labor stability.

Manitoba Electrical Association Making Progress

"A live-wire organization."

This was the appropriate and even professional term applied to the Manitoba Electrical Association the other day by a prominent citizen who had the privilege of mingling with the members at one of the association's enjoyable noon-day lunches.

Although it has not yet celebrated its first birthday the M. E. A. has made rapid strides and, comprising, as it does, many of the most representative men in Manitoba, is considered to be one of the most influential bodies of its kind.

The dying groans of the old Jovian Society were really the birth-pangs of the Manitoba Electrical Association. War so depleted the ranks of the former society that to all intents and purposes it had been effectively torpedoed. But with conditions rapidly assuming a normal state, and ex-Jovians returning from overseas, there arose the desire to draw all men interested in the electrical profession into one common body again. The old society was fanned into life, but only for a brief period, for on its ashes were laid the foundation stones of the present association. The charter of the old Jovian Society was returned to headquarters.

The reasons which prompted this change are not far to seek. Things are moving very fast these days and present-day problems demand quick action. It was felt that to maintain the Jovian Society with headquarters in the U. S., was too unweildy and placed a handicap on aggressiveness. The members felt that greater benefits could be obtained and the interests of the profession better taken care of and advanced if a purely local association, covering the province, and responsible only to itself, was formed.

And so the Manitoba Electrical Association sprung into being. That this association is aggressive can be gleaned from the fact that its membership, although restricted to owners and employees of electrical contracting or supply houses, public utilities of an electrical nature, engineers, appliance and supply men, already exceeds 125. Its officers are:

President—Geo. L. Guy.

Executive—J. M. Leamy, W. H. Reynolds, W. F. Minty, S. F. Ricketts.

Secretary-Treasurer—M. E. Deering.

The association feels distinctly fortunate in having for its officers men of such keen professional integrity and so ardently devoted to the interests of the profession as above.

Although much could be said as to what the Association hopes to accomplish, the simple repetition of the objects of the association, as expressed in the by-laws makes further elaboration in this regard unnecessary. The objects are.

"The cultivation of a spirit of good fellowship and fraternity among its members. The promotion of an intelligent interest in such public matters as may properly concern us as citizens, and to forward the electrical industry as a whole by such methods as will have for their direct objective the education and enlightenment of our members through public speakers, or such other as may be approved by this association."

Regular luncheon meetings are held twice a month, which are more in the nature of a "get-together" social gathering, while it is contemplated to hold a series of evening meetings when technical papers will be given.

The Roller-Smith Company, New York, are distributing a leaflet on radio frequency instruments. The leaflet illustrates and describes a number of ammeters and also the current squared meter designed to meet government requirements for wave meter and decremeter use.

Melfort, Sask., a Progressive Town

The town of Melfort, own and operate their own electric power and light, telephone, waterworks and sewerage. The prime mover up until the past season consisted of a 150 h.p. Deisel engine direct connected to 100 kv.a., C.G.E. generator and exciter. The water is pumped from surface springs two miles from the town by electrically driven pumps and distributed by the compressed air system. The sewerage is disposed of with an up-to-date sewage disposal filtration system.

During the past year the capacity of the electric plant has been doubled by the completion of the installation of a second 150 h.p. Deisel engine direct connected to a 100 kv.a. Siemens generator with belt driven exciter. This necessitated the erection of another generator switchboard panel and a feeder panel. One of these is not yet in place but is being supplied by the C.G.E. company in addition to a number of other switchboard fittings which permit of paralleling the two units, this giving a total of 300 h.p.

On the installation of the second unit the town inaugurated a continuous lighting and power service and have now linked up over 100 h.p. of day load, serving them with a three-phase, 220 volt, 60 cycle current. Present prospects indicate a good year for 1920 and the necessity for further additions at an early date.

The plant is in charge of Mr. Harold M. Bailey, who is superintendent of the light, power and telephone department. Mr. Bailey returned to Canada in September after five years overseas.

To Develop More Water Power in New Brunswick

A committee of the Commercial Club, of which P. D. McAvity is chairman, held a conference with Premier Foster recently regarding water power development in New Brunswick. The committee urged the Premier to present a resolution in the Legislature in the interest of power development. The Premier promised the committee that the Government would submit the report of the waterways commission to the Legislature and that a bill would be introduced during the session.

Railway Electrification

"Railway Electrification" was the subject of an illustrated talk given by Mr. W. G. Gordon, Transportation Engineer of the Canada General Electric Company, Toronto, before the Montreal Weekly Electrical Luncheon, at their dinner on January 21st. Mr. Gordon gave an outline of the work done by the General Electric Co., in the electrifying of American railroads, together with illustrations showing tests made and the different sizes of electrical locomotives now in use. A committee was formed to make arrangements for a two day convention of the electrical men of Montreal to be held early in February at which Mr. W. L. Goodwin will be the principal speaker.

Automatic 'Phones for Halifax

The Board of Public Utilities of Nova Scotia has before it an application of the Maritime Telegraph & Telephone Company for permission to issue preferred stock to the amount of $1,000,000, intended for the 1920 budget of the company, which will cover extensive improvements and additions to the service throughout the province. One of the important changes in the Halifax system will be the installation of the automatic telephones in the north end.

The Coal Consumption of Power Plants

By Mr. Robert H. Parsons*

The importance of economy in the use of fuel need not be emphasized. The cost of coal overshadows every other item of expense in the operation of a steam plant, and, in fact, it usually exceeds all other expenses put together. Hence there is no direction in which a reduction of cost may be more profitably sought than in the economy of coal, for the financial benefit of reducing the coal consumption by even a small percentage is very considerable, and is obviously greater than can be obtained by effecting a corresponding saving in any other item. The numerous instruments met with in a modern power-station, such as CO^2 recorders, and gas and feed water thermometers, Lea recorders, and, one may almost add, vacuum gauges, have no other function than to assist the engineer in reducing the number of pounds of coal per kw.h. This object is always before his eyes, and yet if one asks him what he considers the coal consumption per kw.h. of his plant ought to be, it is very difficult to get a definite answer. He knows that the figure varies, not only with the efficiency of operation of the plant, but with the output as well, and he would most likely be doubtful as to whether a consumption of, say 3.5 lb. of coal per kw.h. during a shift on which the output was 10,000 kw.h. was better or worse than a figure of 3.25 lb. per kw.h. with an output of 15,000 kw.h. per shift. This uncertainty as to what constitutes a reasonable coal consumption for any given output is a great hindrance to the improvement of efficiency, as the conclusions which might be drawn from the results of any change of the method of operating the plant are rendered doubtful by the effect exercised upon the consumption by varying loads.

The object of this article is to place before engineers a simple graphic method of keeping a continuous check upon the efficiency of their plant, and to provide a criterion by which the performance of the plant may be judged, irrespective of the load which it may be carrying. It will be shown that standards of both coal and water consumption per kw.h. can be determined for any particular plant, and that the performances on any shifts can be usefully compared either with each other or with the standard, no matter what the outputs per shift may be. Thus the effect of any change in the running conditions, whether intentional or otherwise, can be noted at the end of the shift, and adverse conditions can be discovered and rectified with the least possible delay. No lengthy trials of a new class of coal or an altered method of operating the plant are required to determine whether the change is for better or worse. A correct opinion can usually be formed at the end of the first shift on which the change is made. These advantages alone are amply sufficient to justify the small amount of trouble the method involves, but apart from the continuous graphic check upon the overall efficiency of operation, which is obtained, a most valuable light is thrown upon the conditions obtaining in the plant.

Determining Coal and Steam Consumption

The standard coal and steam consumption of the station are determined as follows. Dealing first with the coal consumption, a chart is prepared on squared paper with a vertical scale reading in pounds of coal burnt per shift, and a horizontal scale reading in kw.h. generated per shift. The latter quantity may be taken either as the aggregate output of the main generators, or as the net current as metered at the outgoing feeders. It is generally better to adopt the latter practice, because, after all, it is the function of the station to produce power for sale, and the current consumed in the station itself, whether by driving auxiliaries or in conversion or other losses, cannot rightly be considered as part of the real station output. If current is generated for driving auxiliaries or motor-generators it is because it is found cheaper than to adopt alternative methods, and the economy so brought about is properly shown in the reduction of the coal consumption per kw.h. of net output.

Another chart, similar to that just described, is prepared for the steam consumption, the vertical scale in this chart representing pounds of water pumped into the boilers per shift, and the horizontal scale denoting total kw.h. generated per shift as before. The most convenient paper for these charts is quarto size, ruled with half-inch squares, each square being further subdivided into tenths. Pads of such paper, having twenty half-inch squares one way and fifteen the other way, can be obtained from any dealer in draughts-man's materials.

Having prepared such charts, at the end of every shift the total coal and the total water consumed are to be plotted on their respective charts over the figure representing the total output on that shift. When a sufficient number of results have been plotted it will be found that the dots on each chart lie about a straight line. The line which lies most evenly amongst the dots must now be drawn in. The easiest way of determining the best position of this line is to draw a straight line on a strip of tracing paper, and then to move the strip about on the chart until the best position of the line among the dots is decided upon. This having been done, the lines can then be drawn on the charts themselves.

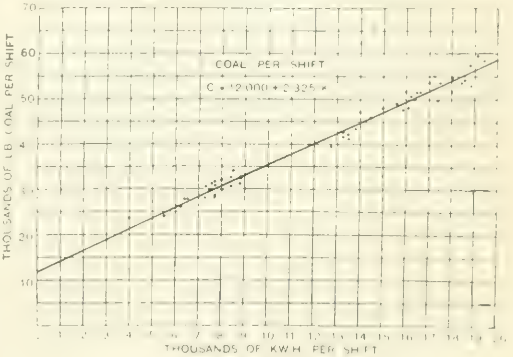


FIG. 1

The charts will now appear as shown in Figs. 1 and 2. The lines on the charts obviously represent the average consumptions of coal and water respectively which are obtained in the station for any output per shift. They thus form standards against which the efficiency of working may be continuously measured, as no matter what the output may be, if the coal consumption on any shift, when plotted on Fig. 1, is found to lie above the line, it is clear that the performance of the station during that shift was not so good as the average. An immediate inquiry can therefore be made into the operating conditions while the facts are fresh. And similarly with the water consumption.

---

*[illegible] Consulting Engineers [illegible]

Standards of Efficiency

As the standards of efficiency, represented by the lines on Figs. 1 and 2 are no arbitrary ideals which are impossible of attainment, but are merely the average working results of the particular station in question, it should be as easy to improve upon them as to fall below them. The effect of establishing such standards is to give the shift engineers something to beat, and the almost inevitable result of checking the daily performance by them is to bring about a higher and more sustained efficiency of the whole station.

Should the coal consumption on any shift be higher than the standard, reference should be made to the chart of water consumption, and if this shows the water consumption per kw.h. to be normal, it is clear that the trouble must be looked for in the boiler-room. It is often convenient, however, to prepare a third chart, upon which the vertical scale reads in pounds of water pumped into the boilers per shift. When the figures for these two quantities are plotted on such a chart, it will be found that the points also lie about a straight line, which denotes the average evaporation efficiency of the boilers. The immediate usefulness of this latter chart is to assist in finding the explanation for any unusual circumstance by showing at a glance whether the standard evaporation per pound of coal has been maintained or not. If it has been maintained, and the coal consumption, as shown on the chart corresponding to Fig. 1 is above the standard, then it follows that steam has been wastefully used. If, on the other hand, the evaporation is below the standard, either bad boiler operation or a poor quality of coal is responsible.

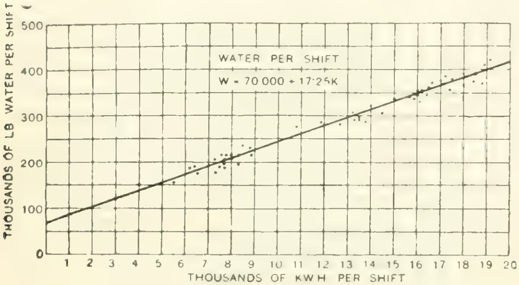


Fig. 2.

As many engineers are more used to the expression of efficiency in terms of pounds of water or of coal per kw.h. than in terms of total consumption, the charts may be modified if desired so as to present the facts in the more familiar form. To do this, the standard consumptions corresponding to various outputs are read from charts (1) and (2), and the figures so obtained are divided by the respective outputs. The results of these divisions are then plotted above the corresponding outputs, and a curve drawn through the points in each case. The charts then appear in the forms shown in Figs. 3 and 4, from which the standard consumptions in lbs. per kw.h. can be directly read. Similarly, of course, a curve showing evaporation per lb. of coal for various coal consumptions can be prepared from the straight line chart illustrating the total water consumption plotted over total fuel per shift. The question raised above as to whether a consumption of 3.5 lb. of coal per kw.h. with an output of 10,000 kw.h. per shift, was a better performance than a consumption of 3.25 lb. with an output of 15,000 kw.h., can be immediately answered by reference to Fig. 3, so far as the particular station we have been considering is concerned. From this chart it will be seen that the standard performances at the two outputs are, respectively, 3.525 lb. and 3.125 lb. of coal per kw.h., so that at the smaller load the actual performance is better than the standard, while at the greater load it is worse. Thus the consumption of 3.5 lb. per kw.h. with an output of 10,000 kw.h. indicates that a higher operating efficiency is obtained than when only 3.25 lb. of coal are used per kw.h. with an output of 15,000 kw.h.

Increased Efficiency by Use of Charts

The most practical use which can be made of the charts we have described, particularly of the type illustrated in Figs. 1 and 2, is to keep them on the switchboard, and have the coal and water consumption of the station plotted upon them at the end of every shift. By doing this the efficiency of the station working is brought graphically before the eye of the engineer in time for him to look into any conditions which may have brought about a bad performance. If either the coal or water consumption is appreciably different from the standard, a note should be entered on the log sheet calling attention to the conditions of operation, with a view either to repeating them or avoiding them in future, as the case may be. It will almost always be found that the mere fact of the engineers having before them a definite criterion of efficiency, will bring about so great an improvement in operation that new and more exacting standards can be established. As such standards are really nothing more than an average of, say, a fortnight's performances, the correction of a standard to correspond with improved operating conditions has never a depressing effect upon the staff, as from its very nature they always have an even chance of beating it.

It is sometimes considered a defect of such charts that they give no indication of the order in which the records are plotted, and therefore they do not show whether the station is improving or otherwise in efficiency as time goes on. This objection can be overcome in an extremely simple manner, and a continuous curve of efficiency obtained for any station. The method will be described later, as its explanation depends upon an understanding of what the lines, which we have considered as standards of efficiency, really mean. We will therefore proceed to discuss the significance of these lines, because when properly understood they bring out facts concerning the plant which cannot be obtained in any other way.

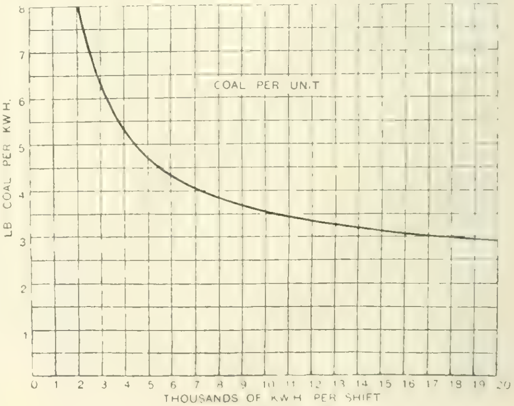


Fig. 3.

Each line may, of course, be represented by a simple equation which can be determined as follows: Referring to Fig. 1, let the coal consumption per shift be represented by C, and the output per shift by K. The value of C at any point on the line is obviously equal to the height at which the line meets the vertical through O, plus the additional height due to the slope of the line. The first of these quantities is read directly from the scale on the diagram, and is 12,000 lb. for this particular case. We also see from the diagram that when, for example K = 20,000, the corresponding value for C is 58,500. Subtracting from this latter figure the constant of 12,000 we see that C increases in value by 46,500 for an increase of 20,000 in the value of K, or by 2.325 lb. for every unit increase of K. The total value of C at any point is therefore

$$C = 12,000 + 2.325\ K \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

This is the equation to the line in Fig. 1, and gives the total coal sumption corresponding to any value of K, that is to any output per shift. By dealing with Fig. 2 in an exactly similar manner we get another equation, namely

$$W = 70,000 + 17.25\ K \qquad (2)$$

in which W represents the total number of pounds of water per shift, and K is the total output in kw.h. as before.

Facts Relative to the Operation of the Station

These equations bring out certain very instructive facts relative to the operation of the station to which they refer. In the first place, we see from equation (1) that 12,000 lb. of coal are burnt per shift without any corresponding production of energy, and that an additional 2,325 lb. of coal are consumed for every kw.h. that is generated. The constant loss of 12,000 lb. of coal per shift represents the "stand-by loss," or the fuel required to make up all radiation, condensation, and other losses, and to maintain the plant for a shift in a state ready to carry the load. These losses have to be borne whatever the output of the station, and are practically independent of it. Thus, however, much coal we burn per shift, we can regard 12,000 lb. of it as used to make good the constant losses, and the balance as being usefully burnt in the production of power. Similarly from equation (2) we can regard the total water consumption as being composed of two parts, namely, 70,000 lb. per shift used without any corresponding output of energy, and an addition 17.25 lb. for every kw.h. produced. As before, the constant of 70,000 lb. represents stand-by losses, leakages, etc., and remains substantially the same whatever the output of the station. These substantially constant losses of coal and steam must, of course, in the nature of things increase somewhat with the load; but the plotted results always indicate that such increase is negligible in practice, and that no detectable error arises from treating them as constant. In one case coming under the writer's notice a large steam station was acting as stand-by to a hydro-electric plant, and the vicissitudes of operation of the latter caused the steam plant to be called on for anything between 1,000 kw.h. and 60,000 kw.h. per day, both extremes being met within a single month. The straight-line law was found to hold over this great range, thus justifying the practical assumption of the constancy of stand-by losses, even under so great a variation of output.

Referring again to our two equations, namely,

$$C = 12,000 + 2.325\ K \qquad (1)$$

$$\text{and } W = 70,000 + 17.25\ K \qquad (2)$$

if we multiply each by the numerical coefficient of K in the other one, we obtain

$$17.25\ C = 207,000 + 40.10625\ K$$

$$2.325\ W = 162,750 + 40.10625\ K$$

Subtracting the second of these from the first, we obtain

$$17.25\ C - 2.325\ W = 44,250$$

and dividing throughout by the coefficients of C and W respectively we have either

$$C = .1348\ W + 2565 \qquad (3)$$

$$\text{or } W = 7.418\ C - 19,030 \qquad (4)$$

These two latter equations are identical, but each form is useful for the purpose of bringing out some fact. They could have, of course, been derived directly by plotting the total cost burnt per shift against the total water consumed, in the same way that equation (1) was deduced from Fig. 1.

From equation (3) we see that if W were zero, i.e., if no steam at all were to be used per shift, there would nevertheless be 2,565 lb. of coal required to maintain the boiler-house conditions, and to keep up steam. We have already seen from equation (1) that if no kw.h. were to be generated 12,000 lb. of coal would still be required per shift, to make up the stand-by losses. Hence the difference between these figures, namely, 9,435 lb., respresents the coal necessary to make good the engine-room losses only, including auxiliaries, etc., if the station were running at no load. An analysis of the results of any power station along these lines cannot fail to be of very great help to the engineer in determining what his no-load losses are, and what part of his plant is chiefly responsible for them. But besides indicating the magnitude and source of the no-load losses, the equations further show the efficiency to which the plant is approximating as it becomes more and more fully loaded. If, in equations (1) and (2) the value of K were to be taken as very large indeed, the constant numbers would be negligible in comparison, so that the coal consumption would eventually become 2,325 lb., and the water consumption 17.25 lb. per kw.h. These are the figures to which the curves in Figs. 3 and 4 are tending.

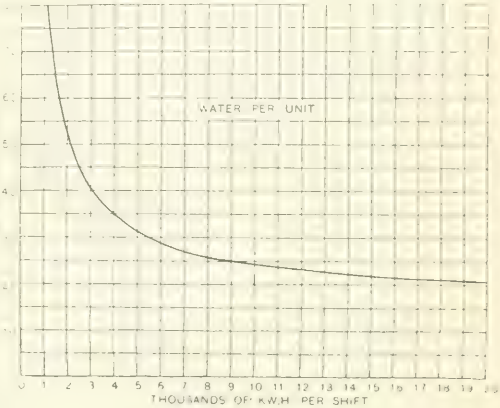


FIG. 4

By similar reasoning we see that the evaporation figure approaches more and more nearly to 7.418 lb. of water per lb. of coal as the work of the boilers is increased. These limiting figures can, of course, never be obtained on a finite plant equipped and operated similarly to the station we have been considering, but they show the efficiencies to which such a station is tending when no change is made beyond increasing the load. It is, however, quite true to say that any extra load given to the station can be carried for an expenditure of 2.325 lb. of coal and 17.25 lb. of water per kw.h. of the output in question, so long as the methods of operation remain the same. This deduction is a useful one to make when it is necessary to determine the net cost of carrying any particular load. If, for example, 2,325 lb. of coal cost a halfpenny, the power station in question would lose by paying more than one halfpenny per kw.h. for any power purchased, unless the effect of purchasing was to bring about some saving other than that of coal.

[illegible] the [illegible] that the [illegible] of the [illegible] in Figs. 1 and 2 [illegible] whether the earlier records plotted were better than the later ones, or, vice versa, was frequently looked upon as a drawback. There is no doubt that a chart which will show graphically the trend of efficiency, so that a progressive increase or decrease will be brought clearly to the engineer's attention, is often very useful. Fortunately, also it is particularly simple to construct, when once the equations to the stations have been determined. Referring once more to equation (1), we see that if there were no constant term, the coal consumption would be 2.325 lb. per kw.h. for all outputs. Hence, if when the figures come in at the end of every shift, the engineer first subtracts the constant from the actual consumption, and then divides the remainder by the electrical output, he will always get 2,325 if the standard efficiency of the station is maintained. We may therefore prepare a chart, in which the horizontal scale represents successive shifts, and the vertical scale reads in pounds of coal per kw.h. A heavy straight line is drawn horizontally across the chart at the level corresponding to 2.325 lb. per kw.h. The coal consumption per kw.h. (calculated after the subtraction of the constant from the gross amount) can then be plotted on the chart shift by shift, and when the records are joined by a continuous line a graph is obtained illustrating in the clearest manner how the efficiency of the station compares with the standard as time goes on. An exactly analogous method can be adopted to obtain a continuous graphic record of the steam consumption of the station per kw.h., or of the evaporation per lb. of coal, and with such records a very interesting and instructive comparison may be made between the improvement in operating efficiency obtained in the engine-room and boiler-room respectively.

In conclusion, there are given a few equations obtained from the records of actual power stations. They must not be taken as examples of commendable economy, for in only one station is a really good efficiency shown. Some are indeed very bad, as is only to be expected since they are based upon log sheet records made while the station was not under critical observation, and it was the desire to improve the efficiency which led to the analysis of the records. In all cases the equations refer to the performances "per shift," and the output signifies the gross output of the main generators.

Station	Equations.	Notes.
A	$C = 17,300 + 4.816\ K$	Fuel, low grade lignite slack. This plant was a stand-by for a hydro-station, and output varied from 1,000 kw.h. to 60,000 kw.h. per day. No water consumption figures available.
B	$C = 12,500 + 3.75\ K.$ $W = 66,660 + 26.923\ K$ $C = 3,214 + .1393\ W.$ $W = 7.179\ C - 23,077$	Fuel, fairly good slack. Output 10,000 kw.h. to 20,000 kw.h. per day. The steam consumption in engine room is very high.
C.	$C = 21,000 + 2.9\ K$ $W = 110,000 + 17\ K.$ $C = 2,235 + .17\ W.$ $W = 5.86\ C - 13,10$[illegible]	Fuel, low grade lignite. Only one generator was running during the whole period. The steam consumption of this generator was measured as $S = 48,000 + 13.35\ K.$ per shift during the period, showing heavy steam consumption of auxiliaries, &c. Output of station 20,000 kw.h. to 45,000 kw.h. per day.
D.	$C = 10,000 + 2.06\ K$ $W = 60,000 + 15.3\ K.$ $C = 1,921 + .134\ W.$ $W = 7.42\ C - 14,272$	Fuel, about 12,400 b.th.u. per lb. Every care taken to economize heat and steam. Output 20,000 kw.h. to 40,000 kw.h. per day.

Origin of "Watch Your Step."

From an analysis of nearly ten thousand accidents recently reported by manufacturers, chiefly electrical, in the United States, the highest percentage of those that occurred outside the companies' premises, were attributed to slipping, tripping and falling, hence the origin of "Watch Your Step." This means, that the greatest danger lying in wait for a man in his hours of leisure, is the pavement beneath his feet. The highest percentage of falls, came from those occurring on the level, while others came in the following order of seriousness, from ladders, over obstructions, on stairs, from poles, into excavations, from temporary supports and from scaffolds.

On the companies' premises, "handling material" comes first. Accidents from electric current—from shock, burns, eye-flash—rank fourth in a list of eighteen classes of accidents. Only .7 per cent. of all the accidents reported, were due to exhaustion from heat, which seems strange—one imagines that more suffer from heat prostration than is actually recorded.

From a general consideration, injuries to fingers were highest, eyes next, and ears last in a classification of thirty-five anatomical locations. From the standpoint of occupation, linemen ranked first and carpenters lowest.

Perhaps the most interesting classification is that, which considered the length of service. Of all the accidents reported, 25.9 per cent., or the highest single percentage, had all been in the employ of the companies less than six months. Those veterans of over twenty years service, contributed only 1.1 per cent to the casualty list.

To determine the seriousness of the various causes of accidents, by consideration of the number only, resulting from each cause is misleading. While only 8.3 per cent. were injured by electrical current, these accidents were responsible for over 70 per cent. of the total lost time, and 70 per cent. of the serious and fatal accidents. The fact is however, and it is encouraging, that 75 per cent of this class of accidents are preventable, when the proper safety devices, such as enclosed switches, rubber gloves, etc., are installed, while falling will continue as long as man fails to "Watch His Step."

Home Lighting

The question of proper lighting in the home is one of fascination to everyone. All of us have rather fixed ideas as to what is best adapted to our own needs and to our own conception of the artistic.

Artificial light is a wonderfully flexible medium at the disposal of the interior decorator, be he amateur or professional. No element of the decorative scheme offers as many possibilties or has as distinct a psychological effect. The possibilities are so great that a life-long search would not reveal all of them and the opportunities for the display of individual tastes are unlimited. A properly lighted room at once gives the impression of a pleasing picture and a feeling of comfort. An interior inappropriately illuminated is always repelent although sometimes the casual observer does not realize that the light is at fault. No matter how skillfully a room may be planned as to harmony of fittings and balance of color, if the lighting equipment does not function properly, the decorator has failed to achieve success.

Electrical Ontario Says "All Together"

Become Acquainted and Discuss Ways and Means of Spreading the Gospel of "Do It Electrically"—Only Cloud on the Horizon is the Shortage of Power

Thursday and Friday, January 15 and 16, will long be remembered by electrical men in the province of Ontario as the greatest "get-together" event ever pulled off by this industry. Primarily it was the convention of the Ontario Municipal Electrical Engineers that started the ball rolling but the interest and enthusiasm was cumulative right up to the crowning event—The Electrical Banquet—where close upon six hundred men met to do honor to the tremendous industry they had created.

On Thursday morning the municipal engineers and other members of the association registered at the Hydro offices on University Avenue and purchased their tickets for their evening dinner. The real convention started in the afternoon when Mr. Oswald H. Scott, Hydro manager at Belleville, and President of the Association, delivered his address. Certain other matters of importance came up for discussion and the officers for the following year were elected. In the evening the delegates met at an informal dinner in the Walker House. The guest of the evening was to have been Major Pope, Secretary of the Ontario Commission, but unfortunately he was detained in Ottawa. His place was ably filled, however, by Col. Carmichael, the newly elected member of the Hydro Commission. Later Commissioner W. Ellis, of Hamilton, M. W. Andrew, and Kenneth A. McIntyre of Toronto, spoke briefly, as also did Messrs. W. L. Goodwin, S. A. Chase, and O. H. Caldwell, of New York. The dinner party broke up early so as to enable the delegates to attend the theatre or otherwise amuse themselves.

On Friday morning Mr. Jackson, Hydro manager at Chatham, read his paper on "Grounding," which was reproduced in our last issue. The afternoon session opened with a brief discussion on the power shortage followed by a statement by Mr. Jeffery covering the progress of the Commission's plans to increase the supply. Mr. Buchanan, Hydro manager at London, then read his paper on "Merchandising"; this also was reproduced in our last issue. Mr. Buchanan's paper was discussed by Mr W. L. Goodwin and others.

The climax of the two days' proceedings was reached on Friday evening at 6.30 when somewhere between five and six hundred electrical men and some twenty guests attended the electrical banquet in the King Edward Hotel. This banquet was arranged by a committee representing the various electrical organizations: Association of Municipal Electrical Utilities of Ontario; Toronto Section American Institute of Electrical Engineers; Canadian Associated Manufacturers of Electrical Supplies; Canadian Electrical Supply Jobbers' Association and the Ontario Association of Electrical Contractors and Dealers and was composed as follows: Kenneth A. McIntyre, J. F. S. Madden, D. M. Fraser, Geo. Leacock, C. H. Hopper, A. H. Hull, Frank T. Groome, H. E. Doty, C. H. Willson. W. R. Carr acted as chairman of the committee and M. W. Andrew as secretary.

The banquet was presided over by Brigadier-General C. H. Mitchell, C. M. G., and a reception committee, composed of Senator Frederic Nicholls, (chairman), P. W. Ellis and A. Monro Grier, K. C., received the guests. These included His Honor the Lieutenant-Governor; His Worship Mayor Church; Senator Nicholls, president and general manager Canadian General Electric Company; P. W. Ellis, chairman Toronto Hydro-electric Power Commission, chairman Queen Victoria Park Commission; A. Monro Grier, K. C. president Canadian Niagara Falls Power Company, president Canadian Electrical Association; W. L. Goodwin; S. A. Chase; Colonel Leonard, president Engineering Institute of Canada; James White, assistant to Chairman Commission of Conservation; Lieut.-Col. Alex. Fraser, A.D.C. to the Lieutenant-Governor; Colonel Carmichael, Ontario Hydro Commissioner; T. R. Rosebrugh, Professor of Electrical Engineering, Faculty of Applied Science and Engineering, University of Toronto; Dr. A. B. McCallum, Chairman Advisory Council for Scientific and Industrial Research; Arthur Hewitt, President Consumers' Gas Company, President The Empire Club; K. J. Dunstan, Manager Bell Telephone Company, President Board of Trade Toronto; J. W. Bain, Professor of Applied Chemistry, Faculty of Applied Science and Engineering, University of Toronto; T. A. Russell, President Canadian National Exhibition; Sir William Hearst, ex-premier of the Province, recently appointed member of the International Waterways Commission.

The proceedings are covered in more detail in the following pages:

Convention Opened on Thursday Afternoon—President O. H. Scott Addressed the Delegates as Follows:

"Our association is only two years old, and it is very gratifying to see the large number of members present. Let us for a minute look back and see what we have accomplished. Two years ago we had a membership of 50, whereas to-day we have 104 member utilities. The question that naturally arises is: Has the change been beneficial? I think you all will agree that it has been very much so. Before reorganization we carried on with a grant of $50 from the Ontario Municipal Electrical Association, but were in reality dependent on the Hydro-electric Power Commission of Ontario, whereas we have a revenue of $1000—a very necessary asset for the success of any association.

"Then, too, the meetings have taken on a different spirit, which has been demonstrated in the enlargement of the field covered by the various papers and the keen discussion which has been aroused.

"A year ago you opened to membership the commercial section, and it was a good move, as the display at Niagara Falls last June in itself demonstrated the value of having the commercial men represented in our association.

"Looking toward the future, I see great opportunities for this association to do important work. The spirit of cooperation between the electrical fraternity which was started a year or so ago has developed wonderfully and, in my opinion, is going to do more for the welfare of the various electrical organizations than anything else.

"There is one question which we will be called upon to take care of very shortly, and that is the new membership which will be open to us due to the development of Hydro radials. Your membership committee should be asked to consider this matter and report at the next meeting.

"I trust that the amendments to the constitution will meet with your approval. It is very necessary that we have the most democratic method of electing our officers that can be devised. We must have the best representatives and they must be chosen from the entire membership, rather than from any particular section.

"Besides the question of standardization of plugs and receptacles which has already been referred to the Rules and Regulations Committee, there is the question of standardization of wire construction. I believe that the Ontario Commission is working on such a set of rules, and I would suggest that our association should ask that they be submitted to us before they are made standard.

"Among the many other matters which should be considered and on which committees should be appointed, one of the most important is "Safe practices." We, in the central Ontario system have given this matter considerable attention and have attained success in the prevention of minor accidents. I would suggest that a committee be appointed to consider this matter along with that of joint insurance."

Oswald H. Scott, Belleville, re-elected President

Following the presidential address, the reports of committees were presented.

The election of officers for the ensuing year resulted as follows: President, O. H. Scott (acclamation); vice-president, M. J. McHenry; district vice-presidents: Niagara, O. M. Perry; Central, A. T. Hicks; Northern, R. H. Martindale; Georgian Bay, R. H. Starr; Eastern, H. F. Shearer; Secretary, S. R. A. Clement; treasurer, R. C. McCollum. The following were appointed committee members: Papers Committee—H. H. Couzens (chairman), L. G. Ireland, J. G. Jackson, P. B. Yates, W. E. Reesor; convention committee —V. S. McIntyre (chairman), Geo. Leacock, E. I. Sifton, J. J. Jeffrey, Geo. C. Rough; Regulations Committee—A. T. Hicks (chairman), R. H. Stafford, T. C. James, H. F. Strickland, E. H. Porte. Messrs. W. G. Pierdon and H. P. L. Hillman were chosen as auditors.

Rates and Service Charges

The first question brought up for discussion had reference to rates and service charges. This question had been raised by Mr. P. B. Yates, of St. Catharines, in a letter to the Papers Committee, requesting its consideration, and in order to bring out the opinion of the convention on the matter, Mr. Yates read the letter, which ran as follows:

"I would respectfully suggest that there be a general discussion on rates, the one subject of mutual interest to every manager, superintendent and operating man of every Hydro System. We are all interestel in load factor correction, or we should be, but a great many of us have not sufficient engineering foundation to thoroughly understand the talk and calculations of an expert on this subject. A number of us are interested in merchandising, but in the municipalities doing the largest merchandising business there are ten who are interested in operating questions to one man who is interested in merchandising, and in some of the municipalities we have too much to do without adding the burdens of a retail store.

"There are three subjects I would suggest for consideration, all of them of vital interest in the Niagara District, where the increase in the use of electric appliances in the home is rapidly replacing the munition load of 1918. All through Southern Ontario from the Niagara River to the St. Clair River, a district formerly so well supplied with natural gas, the growing shortage of the gas supply has been forcing the installation of electric stoves, auxiliary heating devices, and water-heaters, and we must prepare for it.

"Considering our rates for commercial lighting and power, is it fair that a home with fifteen lights installed, a connected load of, say, six hundred watts and a maximum demand of possibly an iron or a toaster, should pay the same service charge as the house next door with the same installation and in addition an electric range with a demand of six thousand five hundred watts, or an electric fire-place with a demand of two thousand or three thousand watts? A small factory installs a five horse-power motor at two hundred and twenty volts and is connected single phase to a three-wire system on the street and pays a service charge of $1.00 per horse-power installed. An electric stove may be an installed capacity of nine or ten horse-power and we exact no service charge whatever in excess of a similar-sized house with the lamps as the only load. This has been a question before us for some time, but I maintain that it has not been solved in an equitable manner. The diversity of electric stoves may be very great, but this also applies to small motors. In addition, it is not only the question of whether we are getting enough money from the stove business, but the rates, to be consistent, honest and fair, should include a service charge which is fair in whatever class the consumer may fall.

"The second subject is one which arises from the use of such appliances. A regulation should be made enforcing the use of three-wire services, circuits and branch circuits to electric devices, say, in excess of one thousand watts. This will apply principally to electric heaters, a device generally used during the period of the maximum demand on the secondary circuit supplying that residential district. Transformer capacity must be installed for such load and if a three-wire secondary is in use it requires twice as much transformer capacity for such a device connected two-wire one hundred and ten volts as it would require if connected two hundred and twenty volts two-wire or three-wire. In addition, the disturbances to voltage are twice as great unless the copper investment is increased in proportion. If there is an argument that a three-wire branch circuit means greater cost of installation to the user, this can be overcome by a two-wire two hundred and twenty volt branch circuit.

The third subject is related to both the above. Locally we grant a flat rate on hot-water heaters. In fact, we connect hot-water heaters only if they agree with three conditions:

1. They must be connected on the flat rate at a certain cost per horse-power per year. This automatically takes care of the use of heaters excessive in size with their resultant voltage regulation difficulties, minimizes the investment necessary to give your consumer satisfaction, and en-

M J McHenry, Vice-President

A T Hicks, Central District Vice-Pres.

O M. Perry, Niagara District Vice-President

sures satisfaction, since the consumer has no reason for turning off the heater possibly to save a few cents.

2. We insist that the heater shall be lagged with a heat insulation jacket of some sort so that the installation is economical, and here again we decrease the installation and capacity cost.

3. We ask for the introduction in the circuit between the tap and the heater of a two-wire service box, so that in the fall when the hot-water heater coil in the furnace will supply the demand of the household for hot water, we can remove the fuses and seal the box closed, charging the consumer a dollar for this operation at the time the fuses are replaced again in the spring. This tends to make this service a seasonal service, but the season is during the period of our lightest loads.

"We acknowledge that this service on a flat rate is not standardized throughout the municipalities, but we believe that of all domestic lighting loads that it is the most desirable load that we have yet to secure. Those who do not give a flat rate are being obliged to connect two thousand or three thousand watt heaters with a load which will commonly coincide with the domestic lighting peak, while this suggested rate is more economical and, I am sure from our experience, that it creates much greater satisfaction.

"These are the three questions which I would suggest for discussion at the next convention. From the letters received I know that these matters are of great interest to a number of municipal systems."

Discussion on Mr. Yates' Remarks

Mr. Staford, of North Bay, speaking of his experience in the installation of hot water heaters, said that in North Bay they contracted with the householder for 750 watts on a flat rate. In some cases this capacity was sufficient, but in others it did not meet the requirements. In order to insure satisfaction they installed an additional 750 watts on a meter if considered necessary, which was most often the case. Another difficulty they had in North Bay was the closing of the pipes in the heater, which happened in from three to six months. Sometimes the pipes would be completely stopped in six months, due to sediment or corrosion.

Mr. V. S. McIntyre, of Kitchener, said he quite agreed with Mr. Yates in the matter of equitable rates. He cited one instance in Kitchener where a man had a 6 kw. stove, two 2 kw. fires, and two 2 h.p. motors, and only paid a service charge of 60 cents, though he used 90 per cent. of the transformer capacity on his street. His next door neighbor, with an iron, a toaster and lighting service, paid a service charge of 65 cents. In regard to electric water heaters, they found in Kitchener that the elements burnt out in about three months due to the fact that they became coated with lime, of which there was a considerable amount in the local water supply.

In reply to a question as to the capacity required for electric water heaters in barber shops, Mr. Stafford stated that in shops with two or three chairs a 750-watt heater would give them more than they could use, except on Saturday nights, and was ample for the requirements.

Mr. Yates brought up the question of allowing the second follow-on rate to electric stores, declaring that they abused the privilege and that it should not be granted to them.

Mr. Sifton, of Hamilton, agreed with Mr. Yates, that the electric stores were abusing the second-follow-on rate, and believed it should be eliminated. In answer to a question by Mr. Archibald as to the diversity factor of electric ranges, Mr. Sifton told of one district where there were 18 ranges on a 30 kw. transformer in Hamilton, and they never had more than a 25 per cent. over-load on the transformer at peak load. This meant less than 1½ kw. per range, and they were practically all 45 amp. ranges. The speaker was not in favor in making any additional assessment charge in connection with the installation of electric ranges. No range was using current at less than 1 cent. per kw. and their load was distributed over morning, noon and evening, and in that way had at least there times the load factor of house lighting.

Mr. Yates stated that the hours of use for the ranges were shorter than for the lights. In addition, he contended that if the service charge were figured on ordinary consumption, and this normal consumption was charged at a fixed rate, why should there not be a normal consumption figured in the case of the electric range and the charge based on it. The stove load, he said, might vary considerably in different municipalities. In St. Catharines the peak load had been the stove load. Last month it was the breakfast peak on top of the lighting peak. He found that it took 1½ kw. for the ordinary electric range, which meant 2 h.p. at a cost of $28 per year to carry that range, and they did not collect that out of it at the present rating. The speaker stated that the cost of the installed capacity for an electric range had been

R. H. Martindale, Northern Dist. Vice-Pres

H. F. Scherer, Eastern Dist. Vice-President

S. R. A. Clement, Secretary

figured at $150 in recent reports. Where stoves had been installed in St. Catharines, the changes necessary had cost over $1,000 very often. Of course, it often worked out that many more were installed in the same vicinity afterwards, but he did not believe that the cost of the installed capacity in any case was less than $150. It might be different in Toronto and Hamilton, where there were more apartments.

Mr. Buchanan, of London, thought the matter of extra charges for ranges was being stressed a little too much. It would be an ideal condition to make the charge on the basis of the cost to the station, but if followed out to its logical conclusion it would mean that every customer should be treated separately. He asked if in St. Catharines, when the revenue from the different classes of consumers was figured, the domestic business did not show a surplus? No doubt the installation of ranges did not pay in the first instance, but neither did the first customer on the lighting circuit pay for the installation. Mr. Buchanan cited a case in London where there were 12 ranges on two transformers, which were working very satisfactorily, and the demand only averaged ½ kw. He was quite convinced that the rates were adequate, and if there were any preference to be shown the domestic consumer should get it. The manufacturers' electric bill was a negligible item in his total expenses and he could afford to pay more than the consumer, but in any case he thought the rates were equitable.

Mr. Yates objected to the idea that any preference should be shown to any particular class. The charges should not be made according to what the traffic would stand, but should be equitably fixed on the basis of cost. As to the amount of current consumed by the stoves, if they only used ½ kw. on the average, he believed they were not used.

Mr. Stapleton, of Collingwood, cited an instance where he thought a fixed charge of 35 cents was not sufficient. This was where a party whose house was probably three-quarters of a mile from the line, had applied for light and had also ordered a range. Sometimes also they were asked to install service for ranges in rented houses, and afterwards the parties moved and took the range with them. In fairness to all concerned he thought the matter should receive considerable discussion.

On motion of Mr. Stapleton further discussion on Mr Yates' paper was postponed till the next morning.

Municipal Engineers' Dinner

On Thursday evening a most successful dinner was held at the Walker House. Musical entertainment was provided, and afterwards there were a number of speeches. President Scott, the chairman of the evening, declared that the Association might congratulate themselves on their development. They had become stronger during the past year and were rapidly climbing to the top of the ladder. He also expressed his pleasure at having a number of representatives of other branches of the industry present with them, and called upon a number of them to speak.

Mr. W. Ellis, President of the Ontario Municipal Electrical Association, said he was very glad to see the way in which the municipal engineers were handling the business and studying problems which were of interest to the municipalities. He was interested, too, to see that they were trying to keep the public pleased, and he thought it was the duty of any municipality of any size to consider the question of providing power for its future requirements. He himself was bending his efforts to the problem of securing more power, and hoped that it would be possible to overcome the difficulties with which they were faced. The only solution he saw at the present was for the municipalities to put aside a portion of their profits for the provision of steam plant. The demand was becoming more serious and speedy action was required. In conclusion, Mr. Ellis expressed his pleasure at being present to witness the progress of the Association, and wished the members every success and more power—if they could get it.

Col. D. Carmichael, the new member of the Ontario Hydro-electric Power Commission, was also present, and was called upon to speak, in the absence of Major W. W. Pope, secretary of the Commission, who was to have given an address, but was unavoidably absent. Col. Carmichael spoke of the great problems which faced Canada in the days of reconstruction—problems just as great as those she had to deal with during the war. Every citizen had heavy responsibilities resting upon him and must play his part in the upbuilding of his country and its protection. Personally, the speaker believed that every citizen should be self trained and self taught, so that if the need arose he would be prepared to assist in the defence of his native

R. C. McCollum, Treasurer

V S McIntyre, Chairman Convention Comte

H H Couzens, Chairman Papers Committee

land. In this readiness to serve the world citizenship was comprised, and any man who was not willing thus to place himself at the disposal of the state, should be compelled to do so. Col. Carmichael said he did not see that any great change had taken place since the war which made it unnecessary to provide for the defence of the country. There was just as much need of vigilance now as there ever was.

A Great Hydro-electric Centre

Brig. Gen. C. H. Mitchell, Dean of the Faculty of Applied Science and Engineering, University of Toronto was present at the morning session, and made a brief address. He said he saw amongst his hearers several graduates of the Faculty, but he did not come to them in the capacity of Dean of that Faculty, but wished to be regarded as a fellow-graduate. General Mitchell declared that their organization was a splendid scheme and one which Ontario and Canada needed very much at the present time. It would help to make this Province the greatest Hydro-electric centre in the world. They had the potentialities, the facilities and the brains to do that. He had only been home six months was surprised to find that, whereas six years ago there were efforts being made to market power, now the effort was being made to keep people from using it. This struck him very forcibly, coming fresh from the other side. It meant that there was going to be a great demand for power in other areas within the province, not only from water power but also from other sources. During the recent past they had had the opportunity of realizing what a fuel scarcity meant. The coal famine had brought home more clearly than anything else the untold value of our heritage in water power. Those in the electrical business must develop and use our own sources of power so that we could be independent of our neighbor across the line and work out our own fortune.

Discussion on Mr. Jackson's Paper "Grounding" Which was Reproduced in January 15 Issue

In opening the discussion on Mr. Jackson's paper on "Grounding," Mr. H. F. Strickland referred to the question of grounding [illegible] buildings. He pointed out that during the past two or three years in Toronto two people had been killed as a result of shocks received from ordinary houshold electrical fixtures. One was the case of a woman who had taken hold of a portable heater while sitting in a bath tub. This raised the question of what should be done towards the grounding of low tension heaters. It was interesting to note that the original Hydro rules were brought in owing to an accident of this kind, when a little boy was almost burned to death as a result of a flexible cord being attached to a bedpost with no ground to primary at all.

There was also the question of where ground wires should be made whether they should be made on the street side of the watermains. The speaker thought this a little far-fetched. As a general rule if a house were inhabited, the water connections would be made.

In the Underwriters' Code it was required that the ground wire used to ground service conduits must not be the same wire as that used to ground inside conduits, and it had been suggested in many cases that rule should be changed. What was the opinion of the convention?

Recommends Use of Waterpipes

As to the use of water-pipes for grounding as against ground rods, the speaker was very strongly in favor of the water-pipes and thought the regulations ought to make it compulsory to use the water pipes where available. He told of a certain town where grounding of the secondary was required, and as the water-pipes were not available the only thing to use was ground rods. A number of 10-foot lengths of pipe were driven and the local inspector looked them over. They seemed all right and were O. K'd. The town put men on to install them and they were put in use. A few nights afterwards, when the street was wet, a man was driving past one of the poles with his horse and wagon, when his horse fell down. He then got out of the wagon and as soon as he touched the ground he too fell down. Someone else came to the rescue and was also floored and a second horse was also brought down. Finally some one 'phoned the station and the current was turned off and the parties rescued. The first horse, however, died. The speaker had gone up to the town in question shortly afterwards and looked over the grounding rods. He found that they were only driven from two to three feet into the ground. The men who had installed them had simply driven them to solid rock and then sawed them off.

The speaker drew attention to the fact that the regulations only permitted the grounding of secondaries up to 250 volts. Most 500 volt power circuits were connected to motors where the possibility of shock was less, and it was a question whether it would not be better to take a chance on burning out the motor than of killing somebody.

The regulations also now required the grounding of secondaries inside buildings, and the Commission had been endeavoring to enforce the grounding of individual services. A good ground wire inside tended to increase safety, though it should not be the only ground. One instance which showed the neecssity of a good outside ground was that of an apartment house where fires had been started on two ocasions in the ceiling. It was found on investigation that the inside ground was good but the outside ground was defective. The speaker was thoroughly convinced that the grounding of secondaries, especially in residences, could not be done too well.

Testing Grounds

In reply to a question as to the testing of grounds, Mr. Jackson said he thought the proper way to test a ground connection was to pass current through them up to the fullest amount likely to be used. As regards the accidents referred to by Mr. Strickland through shocks from electrical fittings, Mr. Jackson pointed out that there was some trouble with defective fittings. He quite agreed that where water pipes were available they should be used for grounds. With reference to the Underwriters' Rules as to separate ground wires for service and inside conduits, it was, in his opinion, desirable to maintain an absolutely distinct ground outside of the building so as to make sure that any foreign currents would be disposed of before entering the building. Driven pipe grounds were the poorest in use, but a sufficient number of them properly installed gave at least protection to life. For 550 volt systems his proposal was that it should be the general practice to install spark gaps to ground on each phase of the 500 volts. In this way if a man touched a bare wire he would not become a conductor of current. As to value of neutral grounds within buildings, the matter was open to question, but still the speaker doubted if it could be termed dangerous. It was only dangerous when the outer ground was not quite good enough. He had known fires to be started where the outside ground was not good, though the inside ground was perfect.

Mr. James thought too much attention could not be given to the testing of grounds. In the case of a pipe ground, the inclination is to install the ground and think that is all that is necessary. In his opinion, however, every ground should be tested. The water pipe grounds were the best, but in many cases they were not available. If one could get a number of pipe driven grounds in parallel they were all right. There were many cases, however, where the soil was not in proper condition for grounds, and that was where poor grounds were obtained.

Mr. James also drew attention to the fact that a considerable difference in potential was obtained in some instances, owing to the distribution system ground not being connected to the station ground. When the station grounds were connected to the system grounds, uniformity was secured.

Mr. Fisk, of Peterboro, thought waterpipes were the only satisfactory grounds. He had used copper plates at a depth of 8 ft. as grounds, and found they tested out all right at first, but afterwards the resistance increased so rapidly that finally there was no ground left. In his town, they owned the water system and were going to the expense of connecting up to good water pipes and considered it was almost a waste of money to do anything else.

Mr. Martindale, of Sudbury, said that in the north they had certain conditions of soil which resulted in galvanized iron pipes being eaten through. Neither could galvanized iron guy wires be successfully used. They were compelled to use all copper both below ground and above. Where there was a water main within a reasonable distance, they took a tapping machine, such as was used for house water connections, and put a ½ in. service box in the water main and attached the ground wire to the union. This was found very satisfactory.

Mr. Ireland said, in regard to the grounding of household devices, that this question had received some consideration from the rules and regulations committee, and that the means suggested was the making of the neutral continuous, having it well grounded.

Mr. Mulligan said it had been brought out that the only suitable ground was the water pipe. As regards advisability, the Bureau of Standards of the United States claimed that a ground should be considered available up to a distance of 200 ft. As to the probable resistance of joints in the water main, the Bureau advised that the joints on each side be bonded for three or four lengths. In grounding to a water pipe system care should be taken to see that it covered some area. A fatality had recently occurred due to grounding to a water pipe which ended in a river. In connection with the grounding of wires, it was important that the ground wires on the poles should be guarded to protect them from mechanical injury, and the possibility of anyone coming in contact with them. They should also be guarded up the pole in order to protect the linemen.

Mr. Jeffery pointed out that at least 25 per cent. of the municipalities on the Hydro system had no water systems, and urged that there should be some investigation made to see if a system of effective grounding could be secured. There were 4,000 volt distribution systems in towns where there were no water systems. The result was there were no grounds in the houses and insecure grounds on the lines, especially if the soil was shallow. The only thing to do was to go to a low point or the vicinity of a stream and put down as many grounds as possible.

Mr. Starr, of Orillia, thought well of Mr. Jackson's suggestion regarding spark gaps on ground wires.

Mr. Mulligan said that in municipalities where there were no water systems and good grounds could not be obtained it was nothing short of criminal to install grounds at all, for poor grounds were worse than useless.

Mr. Lawlor pointed out that there were municipalities in Ontario where the town overlay rock and it was a question in his mind whether shallow grounds in the soil might not be just as effective as grounds placed in the rock. Another point was the best method of protecting ground wires. The usual method was to use a piece of molding, but with rough poles it was sometimes impossible to make it continuous and, as a result, there were gaps where the wire was exposed. Would it not be advisable to try some covering over the wire which would prevent the wire from burning the pole when it became hot? Would an asbestos covering, with a good weatherproof covering on top, not be effective?

Mr. Jackson, in reply to Mr. Lawlor's question as to the best method of protecting ground wires on wooden poles, gave it as his opinion that the expense should be put in the wire rather than in the protection. A good, strong wire should be used, large enough to eliminate any trouble with the burning of the pole. In regard to grounding to water pipes at a distance, the speaker said it was desirable to do so if possible, but in many cases it would be much cheaper to make the connection overhead.

Mr. Stafford, of North Bay, said that in his municipality it was the custom to make the grounds to the water pipe by tapping a plug in the pipe. In the rock, they placed the wire in small channels and protected it by placing the heavier rock on top. In making a driven ground they dug down about 6 ft. and used 1 in. or 1½ in. galvanized pipe, running copper up the pole.

Mr. Bell, of Mimico, stated that he used a copper band to hold wire to the pole and soldered it on, using a molding for protection. They were fortunate in Mimico in having the waterworks system parallel their electric system.

Mr. McHenry, of Walkerville, had found driven grounds very unreliable and thought they should be tested not only on inspection but periodically afterwards. In Walkerville they had no access to the water system as it was privately owned. They had put in some new grounds last spring and found them very good when installed, but by September they were practically useless. Driven grounds should be given frequent attention, particularly in dry weather. The grounding of services inside of houses was a matter on which the public would have to be educated.

Mr. Hague, of Guelph, said they had considerable difficulty in his municipality in convincing the waterworks people that it was no harm to make grounds to their water pipes. They had all their secondaries grounded, principally to the water pipes. In some cases the connection was made to the gas pipes—going into the shut-off cock with a ¾-in. plug. Usually more than one ground connection was made. With the 550 volt, 3 phase system, the secondary was not grounded, but they had ground protection on all transformers, and in that way could detect a ground on the system. As to the grounding of electrical devices, it was something that should be done and done well. There had been several cases where people had been killed having their baths. He believed that in towns where grounding was well done, it would be well to connect the bottom of the frame of the heater.

Speaking of the moulding on poles, Mr. Maclachlan pointed out that it should be strong enough to stand the spur of the linemen. A 2 x 2 piece cut across diagonally was found satisfactory. In regard to the accident in the bath-tub, this was due to the name plate on the heater becoming loose, and one side dropping down and forming the connection.

Mr. H. F. Strickland said that it was a peculiar fact that in the case of both accidents, if the secondary had been properly grounded the people would have been killed anyway.

Next Meeting Place to be Left to Executive

On motion of Mr. Buchanan it was decided to leave the choice of the meeting-place for the next convention to the executive.

It was thought best to leave the further consideration of the matter of rates, brought up by Mr. Yates on the Thursday afternoon session, to a committee to be nominated by the president.

Discussion on Mr. Buchanan's Paper on "Merchandising" Printed in Our Jan. 15 Issue

Mr. Goodwin opened the discussion on Mr. Buchanan's paper on "Electrical Merchandising from the viewpoint of a Municipal Hydro Department." He said that he agreed with Mr. Buchanan in practically everything, but there were just a few points that impressed him as being dangerous. He thought that the basis of any merchandising policy from the standpoint of the Hydro plants should be founded on what is fair competition or what is best merchandising practice. The government made laws that defined fair competition between merchants, and merchants were, therefore, limited in their activities, and it seemed to him that it was fundamental that an electric shop, conducted as a hydro shop, should recognize the common law under which all merchants were obliged to conduct their business. That perhaps suggested the preparation of a primer, having in mind the laws on which merchants operate and what is considered fair competition. The best practice could only be decided through discussion or experience.

Mr. Goodwin fully agreed with what Mr. Buchanan had said about the importance of location. The best merchants sought the very best locations. Next to the location, the window was the most valuable asset in retailing. One suggestion he had to make was that they should capitalize the name "Hydro." Their business was the business of the masses and there the name was a very important asset. There was one part of the paper with which he was inclined to disagree—that was in regard to the training of the delivery man as a salesman. Salesmanship was no elementary problem and he did not think it well to put this work in the hands of a delivery boy. It would be well, of course, for him to have a basic idea of the electrical problem, and if you can use him as a means to develop the prospect and bring him to the store, you will have more satisfied customers.

Deferred payments, if an extra charge is not made, is bad practice. A charge should be made for the time the money was tied up, as otherwise the customer who paid cash was discriminated against. If this charge was made, the deferred payment plan proved very satisfactory.

The question of service was a vital one and it should be done on a fixed schedule. Regular inspection periods should be made, rather than indiscriminate visits. We must "service" the customers.

Mr. Goodwin was not in sympathy with the practice of trading in old appliances. The danger was that one could not find out who sold it and what the value was. If the device had worked the guarantee period, that was sufficient. They had tried in the United States making allowance for flat irons, but it did not work out. Unscrupulous people would bring in all sorts of devices.

Regarding the payment of electric light bills in the Hydro shop, whereas it had been formerly permitted to pay them in banks, the speaker thought it would be well to extend the privilege to electric stores. He advocated that dealers under proper bond should be made collection agencies for the central stations. After all,, it should be their aim to make the purchase of electric appliances as easy as possible.

The distribution of electric lamps by grocery stores was not to be desired. It had been tried out in New York and had proved to be a failure. The grocer had too many other problems to attend to give proper attention to the sale of lamps. Neither was the speaker in favor of electric stores trading in kindred products. When they went into this kind of business it tended to muddle up merchandise of all kinds. He knew of one electric store in Chicago that was selling cut glass.

Mr. Goodwin said he was a thorough believer in the Hydro or any other utility operating company conducting a retail store. The more stores the better the public would be served and the greater the advancement of the electrical industry. Any Hydro station that was not operating a store was simply deficient in its duties to the public. Co-operative competition set the standard for the dealer. In Oklahama, where the utility was not in the business, the electric stores were antiquated. In the next community where the utility had a store and carried out a good policy, the dealers responded with good stores. There were also many devices which the dealer could afford to popularize at this time, while by the sale of other products at a fair margin, the Hydro store could make it possible to bring down the price of the new devices, such as washing machines, etc., and eventually allow the dealer to come in.

In conclusion, Mr. Goodwin said that Mr. Buchanan showed a very full appreciation of the problems of merchandising and he congratutated him very heartily on the paper he had presented.

Mr. Buchanan replied to some of the points referred to by Mr. Goodwin. In regard to the training of the delivery boy as a salesman, he said it was their object to give their employees a bigger idea than merely to hold on to the job they had. As to deferred payments on electrical appliances, the London Hydro shop charged 7 per cent. on the unpaid balance. The reason why in London they dealt in some kindred products, pots and pans and so forth, was because it was not always easy for the customer to get utensils suitable for use with the electrical devices.

Mr. Perry, of Windsor, said that in his municipality they had been some years later than Mr. Buchanan going into the retail business, but he felt sure from their experience that any Hydro shop that took it up would be very glad they had done so. Last year in Windsor they had done a retail business of 5,130,000 and hoped to materially increase it this year.

Mr. Geo. Leacock, of the Moloney Electric Co., said he had been surprised on a recent trip in Western Ontario to visit some of the Hydro stores and see the development that had taken place in electrical merchandising. In one fine store he visited he remarked to the superintendent that he seemed to be overstocked with electric ranges and was most astonished to be told that the store sold on an average two ranges per day. Mr. Leacock thought co-operation by the dealers in electrical page advertising would be a very fine idea.

Mr. S. A. Chace, who was called upon by the chairman to speak, said that one of the biggest problems before them to-day was to convince the manufacturer of the necessity of loosening up and manufacturing more apparatus and appliances for them to sell. The manufacturers for years to come would be unable to keep up with the progress. Though there might be seasons of business depression, the production should still be kept up in order to meet the greater demand that was bound to come.

Mr. P. M. Lincoln was also called upon to make a few remarks. Mr. Lincoln referred to the part the electrical engineer had to play in human progress and the possibility that they might lose the vision of their privileges and responsibilities. He had read recently a book called the "New Epoch," which was based on the theory of evolution and which went to show how civilization had been built up through the discovery of new powers. The only way to give man the fullest use of his powers was through electrical engineering. Great was the responsibility and great was their opportunity.

Mr. Buchanan suggested that it might stimulate effort on the part of the various Hydro stores if figures of sales were published each month in the Hydro Bulletin. He asked Mr. Goodwin what he thought of the Utility opening a branch store.

In reply Mr. Goodwin said he saw no reason why in a community the size of Toronto a branch store might not be maintained if there was the business. It was just the same proposition as opening the main store.

Mr. W. J. Coleman, mayor of Collingwood, said the Hydro had no store in his municipality, but what he had heard at the meeting had made him a convert to the idea. He inquired whether it would not be feasible for the Hydro shop to help out the local dealers in the matter of stock.

Mr. Goodwin did not approve the idea of the Hydro store becoming a distributing agency for the local dealers. For one reason, it tended to limit the variety of appliances to those carried by the Hydro shop, and this was not to be desired as the diversity factor in electrical goods helped the business. He saw no objection to helping the dealers out, on occasion, with shorts and so on. Styles, however, had a lot to do with purchase, and the more of them the better for the industry.

Lighting the Home

Light is so universal in its application that everyone delights in experimenting with it and in determining what effects can be produced. This very familiarly often breeds contempt and we see on every hand examples of the misuse of modern light sources. Other forms of energy, such as electricity, are far less common and are treated with considerable more respect.

There are certain fundamentals which must be observed: First, the light must be comfortable. It must not be glaring or excessively brilliant. This produces eye strain and irritates the entire system. Extreme contrasts in light are objectionable. In other words, very bright areas adjacent to rather dark ones are not pleasing. Second, the fixture or glassware should be artistic and appropriate. Artificial lighting in the home should not be simply utilitarian in character. The fixture should not be crude and have for its sole excuse for existence the supplying of light. It should be as much a part of the room decoration as the draperies, carpet, or furniture. Anything which is truly artistic is useful. As a rule the simpler designs are the most pleasing. In spite of this generally accepted law, we constantly see fixtures which serve no really useful purpose, and which are most complicated and cumbersome in their make-up. Third, advantage should be taken of the adaptability of modern light sources to color modification and the light toned to suit the decorative scheme. Light is now produced so efficiently that color effects can be secured at a very reasonable cost.

There can be no hard and fast rules laid down as to what represents the best practise in lighting the various rooms in the home. There are many methods which might justly be applied to any one room. Even one's own ideas suffer modification from time to time. One arrangement and fitting of light sources may appear to be the best at the present time and yet in a few months, some quite different scheme may be substituted. Not only does this change of viewpoint occur but there is a great variation between individual preferences.

In view of the above, it is most essential that the home be so wired that flexibility of lighting is practical and can be obtained with minimum expense. A few dollars additional to the initial investment when a residence is being built will yield large returns in comfort and satisfaction. An attempt should not be made to minimize the initial wiring expense by sacrificing adaptability. This course of action usually proves to be false economy.

The lighting equipment itself need not be expensive, but on the other hand, one should not attempt to spend the absolute minimum when purchasing it, for the best in any class of merchandise is not cheap. One would hesitate to buy cheap, poorly designed furniture, but fixtures and lighting glassware are not so well understood or appreciated by the average purchaser and most anything goes.

The housewife would be perfectly willing to spend several dollars for some little vase or ornament which appealed to her fancy and which she thought would add to the appearance of the home.

The "Six Hundred" Electric Banquet

From All Over Ontario They Met on Friday Evening, with a Sprinkling from Other Provinces—Everybody Voted it "Some" Banquet

About six hundred electrical men sat down at the banquet board in the King Edward Hotel, Toronto, on the evening of Friday, Jan. 16. All branches of the industry in the Province of Ontario were represented—engineers, contractor-dealers, manufacturers, jobbers and central station men—and we think it may safely be said that never in Canada has there been a more enthusiastic, more impressive or more important gathering of the men of any industry

Canada

The dinner being over, General Mitchell, as toastmaster of the evening arose to propose the toast "Canada." Few words, he said, were required because Canada had spoken for itself. It had spoken most effectively during the past five years and the nations of the world heard it. He declared it to be the great place of potentialities and resources, not only of natural resources, but resources not of a material kind—the resources of her manhood and her mentality. He called upon Sir William Hearst "a great Canadian," to respond.

Sir William Hearst referred to the great part electricity must play in the development of Canada. This gathering gave one some idea of what electricity really meant to the country. He pointed out that the prosperity of Canada depended almost entirely on the development of its natural resources in electrical power and therefore upon the energy and enterprise that the men before him showed. Great progress had been made, but there were far greater possibilities ahead. Canada, however, had reason to be proud not only of its resources but of its people. It took the war to test the character and fibre of our people and they had stood the test. It was a greater thing to-day than ever before to be a citizen of Canada, and that brought with it greater duties. The men who went overseas showed that they were second to none in resourcefulness and valor. The spirits of our heroic dead were in our midst now to stimulate us to greater efforts. But not only did the war show the calibre of our fighting men; it also showed that the non-combatants of Canada possessed all the soul and sacrifice and service that characterize a great people. There was another thing which, with the war, demonstrated the great influence and importance of Canada in world affairs—her great natural resources and her great ability to turn these resources into the necessities of life. History would record what Canada had done during the war in producing food stuffs.

We looked forward, the speaker said, to a time of depression after the war. How different the situation was. Our factories, enlarged and expanded for the production of munitions, have been rapidly adjusted to the demands of peace. Work was found for our great army of workers and our factories were only limited in their output by the supply of raw material. Instead of falling prices, we had rising prices, and as citizens we could congratulate ourselves on the question of construction after the war and could look forward with courage and confidence to the days before us, believing an era of prosperity lay ahead. Now there was the opportunity to send our goods abroad. We had magnificent waterways to turn the wheels of commerce and carry our ships. Then what an opportunity was ours. Before the war we were astonished at the scientific advancement of Germany, but it took only a few short months and there was nothing a German could do but a Canadian could do better. And there was nothing in agriculture, industry or science that Canadians could not do as well as any people. We had the resources, the brains and the power—what then could prevent Canada going forward by leaps and bounds? Nothing but lack of courage and co-operation. Now there was the opportunity to prove ourselves worthy of the sacrifices made for us. The best monument to the men who died would be a greater and better Canada—a land of peace, a land of plenty, a land where there is co-operation.

The men of the electrical industry had a wonderful opportunity, declared Sir William, to develop the natural resources with which they had to deal. We as a united people in the trying days of reconstruction must make a name for Canada. Then, he urged, let us use the opportunity and so live that in the days to come we might feel we had played a noble part in the difficult times through which we were now passing.

Ontario

The chairman, in proposing the toast to the Province of Ontario, asserted that it was the banner province of the Dominion. Like Canada, it did not need any advertising. The representatives which Ontario had sent overseas had not done much talking, but they had done a great deal of effective work. This province was the best in the Dominion—the best to live in and the best to work in. It had both in natural and human resources a heritage of which any people might be proud.

Lieut.-Col. Carmichael, D. S. O. with bar, M. C. with bar, as he rose to respond to the toast to the Province, was greeted with "The Soldiers' of the King," sung lustily by over five hundred voices. Col. Carmichael said it was not necessary to speak of the resources of Ontario. All knew them. During the war just ended this province had supplied the bulk of the forces that went overseas. The Canadians had done splendid work, but the speaker did not hold with those who in boastful ignorance insisted that the war would inevitably have been lost without them. The Canadian Expeditionary Force was after all only a small unit in the British army. It did its part in co-operation with the rest. So too Ontario was a unit of the Dominion, and if we were to make the country great we would have to co-operate with the other provinces. Col. Carmichael believed that Ontario was the greatest province in Canada, but he was quite willing to have the people of other provinces disagree with him. The task ahead of us was a great one, and it could only be accomplished if all worked together and showed the same steady courage which our men displayed on the field of battle.

The City of Toronto

The next toast was to the City of Toronto. General Mitchell said it was a pretty good place to live in and a still better place to work in, but the man who could best speak for it was the one who had just been chosen Mayor for the sixth term.

"He's a daisy," roared the crowd as Mayor Church stood up to respond, and then, "See him Smiling." "Toronto is an electrical city," declared the Mayor, and he did not believe any other city could have the same claim. Here is

Toronto was the University, which, along with other Canadian universities, had made a great record in the war and which had done so much in electrical work and the training of electrical engineers. In reading the list of those enrolled at the Faculty of Applied Science and Engineering he had found that there were more electrical engineers enrolled than any other class. This was an electrical age. It had taken the war to show what electricity could do.

Toronto had much to be proud of, the Mayor pointed out. Its war record was a great one. It had contributed over ten and a half per cent. of its population for military service and had not taken second place in its givings for Red Cross and Patriotic purposes. The city had a great future before it. It had a magnificent harbor development costing $26,000,000, of which $21,000,000 was subscribed by the people of Toronto. Toronto had been called "hog-town," and was rightly named when it came to paying for things. With these developments and the nationalization of the C. N. R. and Grand Trunk, he believed Toronto would become the hub of the whole Province of Ontario.

Mayor Church gave credit to private ownership for what it had done as the pioneer in electrical development. He thought that the public and private interests were getting more friendly, and saw no reason why they should not be so. Competition was the life of trade, but there was enough credit to go around. There was no reason why they should quarrel and scrap with each other. He hoped that all electrical war was ended. The armistice had been signed, and he was glad to see the better feeling which had resulted. Why shouldn't they have good fellowship? In the upbuilding and development of the country, there was no branch of the community could do more for the public than the men of the electrical profession. Good light and power was not intended for the cities alone, however, but also for the farms. Electrical comforts and conveniences was one of the best remedies for the influx from the farms to the towns.

The speaker also stated that the matter of a proper electrical building at the Canadian National Exhibition was now before the city, and he believed it would mean much in the development of the electrical industry.

Our Guests

General Mitchell proposed a toast to "Our Guests," and in calling on Mr. W. G. Chace to respond, pointed out that he was a Canadian who had lived and worked in Canada in his younger days and had married a Canadian wife.

"We have a great many reasons for being proud," said Mr. Chace, and one of the things we should be proudest of is our country.. He believed that he had every right to call himself a Canadian. His mother was a Canadian and his father was English and he himself had married a Canadian wife.

As he looked over the great audience before him, he said he could not refrain from comparing the happy period of harmony which had come with the days of long ago. Years ago the situation had reminded him of the first record of a fight without a reason. That was when Cain killed his brother Abel. Jealousy then had been the only motive. In the electrical business for quite a period in the early days, they had fought without reason. Antagonism had arisen principally through misunderstanding, but happily, this spirit was disappearing, and the parent gathering showed a fine example of absolute unity.

The electrical industry was a grand electrical orchestra, all were playing in perfect harmony and there was a place for everyone. There had been need for much preparation; the music had to be written, the performers trained; mutual confidence had to be created. That confidence had been secured and there were no fears for the future. This electrical orchestra was playing in perfect harmony, and the speaker felt that the visitors would all take away with them a perfect picture of these harmonious progressive relations.

"The Apostle of Co-operation"

General Mitchell introduced Mr. Goodwin as "The Apostle of Co-operation."

Mr. Goodwin said in part:

"As we were reminded by his Worship the Mayor, in his reference to the conditions in the various professions, there is an opportunity for all of us to co-operate whether we be engaged in Government or private activities. Perhaps no other group of men is charged with rendering greater public service than the men of the electrical industry. What does it matter whether we serve a public or a private organization? We have a duty to perform to humanity and as we perform that duty to humanity we shall be rewarded.

"As I look over the faces of the men before me, it brings home to me how young this industry of ours is. Perhaps the average age of the man in the electrical industry does not exceed 35 years. And how great has been the development. We owe a great deal of credit to the pioneers. Their task was primarily an engineering one. Very little if any, consideration was given to the utilization of electrical energy as a matter of public convenience and comfort. So we find as we get into this tremendous field of public service, some of the faults of the past, when the problem was viewed from an engineering standpoint only. We find also that the future development of the industry is to come into the hands of a new group which I may call the commercial branch, and the progress made will be measured by our foresight and our ability and intensity of desire to co-operate in the solution of the problem of commercial distribution. The engineer and the inventor are in an industry to try and solve a particular problem without regard to the reward they may receive. It is noticeable that these men have not amassed great fortunes from their work. All the great electrical institutions and public utility companies have practically nothing to show for this 30 or 40 years of pioneer work, but now that it has taken a new turn and become a commercial proposition, the electrical industry has grown more rapidly than any other industry.

As we approach the new era we find progress measured by profit. The feature of the industry is going to be relative to all other industry. It is going to be just a cold, hard grind of results. That seems to be the condition all over the world.

You gentlemen have an example here tonight of what co-operation may accomplish. You have your problems, including that of power shortage. This is perhaps primarily due to the war, when you were obliged to set aside all unnecessary operations, but we are away behind and it is going to take a long time to catch up. I predict that two years from now, and five, ten, thirty, forty and fifty years from now, we will be in a worse condition than to-day if we don't organize and find means of making provision long in advance for our requirements. I will tell you gentlemen who are engineers that the commercial branch will keep just as far ahead of the engineering branch as it is to-day. You provide the power and we will dispose of it five times as fast as you can provide it. When you consider that this great force of electrical energy has only been available in Canada or the United States to the principal communities and that they have absorbed more than we can produce, and when you consider further that the per capita consumption in the cities would not amount to one-third that of the rural sections, can you imagine what is going to happen when we extend to the farms. Never will we be able to catch up with the demand and the gentlemen here to-night should realize that they must plan now for five or ten years in advance. The public don't understand the situation. They imagine that if they create the demand to-day, we should be able to supply them with power to-morrow.

And we have not yet started on the job of railroad electrification. Think what that will mean. We must not measure the value of railroad electrification merely from the standpoint of the direct returns on the investment, but look at it from the viewpoint of the resulting efficiency and conservation of our resources. We must take into consideration the conservation of coal and oil for future generations, and we must at once get at this job of electrifying the railways of this great continent. When we think of this great undertaking and then of the struggle that has been going on between private and public ownership, our short-sightedness is evident. It seems to me there is an opportunity for everyone if we show the spirit of fair play. Why not encourage both government and private ownership just as far they can go, for after all is said and done, we will never be able to catch up. The manufacturers themselves are unable to supply the demand, and look at the field that is yet untouched. Take washing machines, for example—not more than one per cent. have been supplied to the homes of the country—and in our business we are talking of deliveries of motors for 1921. Can we ever catch up? Never while this spirit of antagonism is displayed. We must all be ready to work together. Any man who neglects or declines to do so lacks vision. We must have the united support and effort of everyone and must find a way to put aside differences of opinion.

Aside from the railroad electrification or the electrification of industry, perhaps the electrification of the home and the farm will be productive of more good to humanity than anything else. The people in the cities have enjoyed the greatest comforts and conveniences, while the real producer, on the farm, has suffered the inconveniences. No wonder the people on the land have packed up and come into the towns. We men have not had the vision nor the opportunity of extending electric service to the farm.

Down in the States we have operated without plan. Not only have we had this conflict between public and private ownership, but we have also had an equal conflict within the industry. It has been manufacturer against manufacturer, jobber against jobber, retailer against retailer, retailer against jobber, and so on, and the whole industry against the public. We have never sold the electrical idea. Why not make everything as simple as possible to the public mind. The automobile industry is an example of an industry that sells itself. Everything is made as easy as possible. My wife knows just as much about an automobile as I do. She drives one herself and isn't afraid to make a little repair job if necessary. But in the average homes our wives or our sisters are not able to perform the simple operation of changing a fuse plug. In the past we have taken pride in mystery and have frightened the public with warnings. What we need is a campaign of education as to the benefits of electricity and its simplicity of operation. This is a job for every electrical man.

I commented to-day on a situation which appears to me ridiculous. I cited the case of a man connected with the Hydro properties making an installation and another man connected with the same properties going out and inspecting it. In the United States we have delegated this inspection work to the Board of Fire Underwriters—an organization who have not a proper conception of electrical work. There is no reason that I can see why we should be checked and re-checked by men who know less about the inspection than the men who made the installation. Perhaps in the past when business was prosperous and the cost of living was low, we might permit the industry to go on with these inefficiencies, but under present conditions I believe it is an unwarranted waste. We must establish a higher standard of installation and the manufacturers must design devices as nearly fool-proof as possible in order to eliminate inspection. In New York and some of the larger cities most of the important installations are no longer inspected.

But so long as we have this individual effort, we must have the industry policed. The larger manufacturing and utility companies in the States, appreciating their responsibilities, have permitted Mr. Chace and myself to go over the land and preach the doctrine of co-operation. The work must go on in Canada also. You must nominate a man to go throughout the land. I have been in Ontario and Vancouver, but all the intervening section is in a chaotic condition. The public do not know what is wrong and the government does not know what is wrong. It is up to the men of the industry. You should appoint some one to go over the land and establish a higher plane of ethics and preach the doctrine of co-operation.

Mr. Goodwin has "revised and enlarged" his original plans somewhat which now includes 25 planks." These are reprinted on a later page in this issue. Electrical men everywhere in Canada are urged to study them closely and follow them as closely as is humanly possible.

Mr. A. Munro Grier, K. C., upon whom fell the duty of proposing a vote of thanks to those who had helped to make the banquet a success, paid tribute to the various speakers of the evening in terms at once serious, humorous and delightful. He applied to the electrical industry the analogy of fagots in a bundle, which, singly have but little strength, but when tied together form a strong beam which cannot be broken. He also aptly compared individual effort to a drop of water. By itself it can accomplish nothing, but when you have a sufficient number of drops, you get a great accession of force, which is almost irresistible and will turn the wheels of the nation's industries.

Features of the Banquet

The biggest feature in the success of the banquet was the way every member of the committee got right down to work and gave practically all his time for several days before the event. Outside the committee, also, there was the finest possible spirit of enthusiasm and co-operation.

Many favorable comments were heard about the big illuminated sign

Do It Electrically

which was prominently displayed in the main corridor of the hotel downstairs and drew the attention of the public to the fact that for this one evening the hotel was owned by the electrical industry. The sign was very kindly loaned by the Flexlume Sign Company.

A third feature was the "White Way" leading from the "Do it Electrically" sign up the winding stairs and on along the corridor and balcony to the banquet hall. This consisted of a single row of C-4 lamps to the number of two hundred and fifty, spaced about 18 inches apart. The Canadian General Electric Company donated the lamps for this purpose.

Another item which seemed to aid materially in "breaking the ice" among men who happened to be sitting side by side at the tables and who were not acquainted with one another was a card, placed at each plate, admonishing everybody to introduce himself to his neighbor. The card ran as follows. The space below for name and address gave the committee an accurate and valuable record of those in attendance.

The Committee is anxious that all present shall be made to feel right at home. Speak to your neighbors at the table whether you know them or not. Introduce them to somebody else. Get acquainted. This is your Banquet. Make it go!

Fill in blanks and pass to head of table.

Name..

Firm..

Street Address..........................

City..

Another feature that was something out of the ordinary and deserving of special mention was a large cardboard with the words "January 16," thus:

January

16

These were displayed prominently in hundreds of stores, offices and clubs several days in advance of the banquet and served at the same time to draw attention to the date and to arouse curiosity. In consequence there were few people in the city who did not know that January 16 was the date of the Big Electric Banquet.

The same idea was utilized in the letter forms that were sent out in advance to advertise the event. Across these sheets the words "January 16" were printed in very large type, the subject matter of the letter being kept above and below this space so that again the date might be indelibly impressed on the memory.

And in the mention of features the "Electric Page" must not be omitted. For the first time in Canadian History the five daily papers of Toronto all ran a full page of electrical advertisements. This also was carried through by the same committee that had the banquet in charge, even to the soliciting of the advertisements. It is worthy of note, however, that the various sections of the industry became immediately enthused over the idea of an electrical page and the space was all taken up in a few hours. As a matter of fact, there were a number of disappointments because the space was so limited. As indicative of the interest aroused in this way it may be mentioned that nearly all the papers gave liberal space in the same issue to electrical matters—one of them giving over what practically amounted to a second page of articles and interesting facts for their readers. It is hoped, as a further result, that the electrical page will become a permanent feature in many Canadian papers.

Everything considered, the Friday evening banquet is an evidence of what electrical men can do "socially" by co-operation. Is it too much to hope that equally gratifying results can be obtained "commercially" by a similar co-operation?

Who Was There?

Harry Alexander, Limited: H. Rohleder.
W. H. Banfield & Sons, Limited: H. S. Banfield, W. J. Young.
Bates & McPherson: F. S. McPherson, G. R. Hughes.
Beattie-McIntyre, Limited: Kenneth A. McIntyre, George J. Beattie, W. F. Russ, John Hawkins, T. R. Church.
Beattie Brothers, Limited, Fergus, Ont.; D'Alton Potter, N. J. Dive.
Benson-Wilcox Electric Company, London: A. G. Dixon, H. S. Wilcox.
Benjamin Electric Company, F. J. Allen, H. S. Balhatchet, Reg. F. Smith, Samuel Barnes, Cyril Pemberton, A. B. Cornwell, S. F. Faram.
Bennington Electric Company, Stratford: Wm. Bennington, O. A. Bishop, H. A. Everist.
Charles A. Branston Company: Charles A. Branston, James S. LaTrobe.
Brokaw-Eden Company. J. C. Bell, Forbes C. Grassick.
Bright Light Lamp Company: L. T. Flewwelling, G. B. Nicholson.
Canada Wire & Cable Company, Limited: F. John Bell, W. R. Greenshields, Thos. A. Gass, A. R. Murray, (Montreal), L. B. Goddis, E. A. Seath, (Halifax), H. J. Boggis. J. A. Woodard, J. D. Warren, (Calgary), H. Horsfall, W. P. Roper, (Montreal), W. J. Culliton, Harry Riley, F. C. Connery.
Canadian Crocker-Wheeler Company, Limited: J. F. Hill.
Canadian Drill and Electric Box Company: E. R. Beatty, Arthur Heald.
Canadian Fairbanks-Morse Company: Geo. R. Wyer, Geo. A. Patterson (Montreal).
Canadian Edison Appliance Company: F. M. Dusenberry, J. R. Richardson.
Canadian General Electric Company: W. A. Bucke, E. I. Jenking, George W. Watts, James Kynoch, G. S. Martin, R. S. Guscott, A. L. Gillies, O. E. Forrest, D. N. Dexter, Geo. B. Wilson, B. F. Selby, Robert A. Clem, S. E. Brock, Harry Burns, Charles H. Heavis, C. S. Barthe, D. J. Doame, (Ottawa), A. B. Cooper, J. P. Hadcock, D. Logan, S. M. McEachren, H. H. Rimmer, W. J. Sweetman, F. C. Medland, W. E. Young, H. S. McKean, H. C. Parker, Byron Haddy, C. S. Mallitt, J. C. McFarlane, H. V. Cook, A. E. Wilson, C. M. Fraser, J. F. Paxton, H. S. Shannon, G. W. Rogers, W. H. Morgan, (London), J. L. Davidson, R. A. Rose, R. Firth, (Windsor), L. O. Horner, A. S. Edgar, H. L. Sheen, A. V. Burr, C. G. MacDougall, W. F. Sneed, W. G. Gordon, H. V. Maynard, G. S. Stewart, Lockwood Burpee, H. S. Perrott, Arthur J. Cherry.
Canadian Ingersoll Rand Company: G. R. Southee.
Canadian Sunbeam Lamp Company: E. G. Brownlee.
Canadian Westinghouse Company, Limited: C. W. Hookway, W. J. Orr, W. W. Lovell, George F. Foot, (Hamilton), J. W. R. Taylor, H. T. Gibbs, C. H. Hopper, J. A. Wenger, Leonard Leigh, R. C. Philips, W. G. Pengelley, F. E. Wittman, J. M. Leslie.
Canadian National Carbon Company: R. B. Clarke, S. Amato.
Canadian National Railways: E. Kenward.
Canadian Tungsten Lamp Company, Limited Wm F. Kelly.
Carter Electric Company, Niagara Falls: Fred W. Carter.
Central Electric Supply Company, Limited: W. Warren, Charles J. Bell, Milton S. Pierce.
Central Electrical Company, Niagara Falls: W. P. Dixon.
Chamberlain & Hookham Meter Company: S. L. B. Lines, Geo. P. Eaton.
Clarke Electric Company: E. C. Clarke, Francis R. Russell.
Clayton, Neil & Jones, Limited: F. M. Jones.
Conduits Company, Limited: J. Herbert Hall, R. H. Hall.
Consolidated Advertising Agency: Charles L. Hannon.
Crouse-Hinds Company of Canada: S. J. Johnston.
Culley & Breay, Hamilton: J. Culley, M. Crawford.
Devoe Electric Switch Company, Montreal: R. Moncel.
Douglas Electric Company: W. H. Douglas.
Donnelly Electric Supply Company, Ottawa: W. L. Donnelly, E. A. Drury, M. Williamson.
Duncan Electric Company, Ltd., Montreal: A. E. Boyes.
Dunn's Electric: P. J. Dunn.
Diamond State Fibre Co., of Canada, Ltd T. Ellwood Webster.

T. Eaton Company: A. J. McWatters, J. W. Parker.

Easy Washer Company: Harold Eccles.

W. P. Earle & Company: W. P. Earle.

Earle Electric: G. D. Earle.

Eby-Blain, Limited: W. P. Eby, H. Blain.

J. H. Edmunds & Company: J. H. Harris.

Electrical News: T. S. Young, W. R. Carr, C. G. Brandt

Electric Supply Company, Windsor: F. E. Garfat.

Electrical Dealer & Contractor: C. H. Brooks.

Elevator Specialty Company: J. H. Shales.

Ellis & Howard Company, Limited, Kitchener: F. O. Ellis, R. W. Howard, C. E. Holtz.

Equator Manufacturing Company, Hamilton: B. M. Fudge.

Factory Products, Limited: Frank L. Ruse, R. D. Swift, H. Cass.

Ferranti Electric Company: J. W. Chipperfield, Joseph Showalter, Fred W. Rowntree.

Filer-Smith Machinery Company, Winnipeg: R. D. Smith.

Galt Electric & Gas Fixture Company, Galt: E. B. Fewings.

General Electric Company: Geo. H. Magnar, (New York), S. H. Knapp, (Schenectady).

General Motors Acc. Corporation: S. C. Webb.

General Motors of Canada, Oshawa: C. Halliday, (Whitby), A. H. Peterson, (Cobourg).

General Accident Assurance Company: J. O. B. Latour.

General Welding & Manufacturing Company: F. W. Blyth.

Goodyear Tire & Rubber Company: W. A. Voce.

Goad Engineering Company, Limited: Charles E. Goad, Albert E. Wilkes, G. N. Middleton.

Great Lakes Power Company, Sault Ste. Marie: C. E. Pickering.

Grinyer Company, Limited, Guelph: George E. B. Grinyer, H. E. Bates.

R. A. L. Gray & Company: R. A. L. Gray.

G. N. W. Telegraph Company: Geo. D. Perry, Charles E. Davies.

Grace Motors, Limited: C. Templeman, R. G. Blackmore, D. B. McWilliams, G. A. German, F. O. Madden.

Gunns, Limited: Geo. S. McArthur.

Harvey Hubbell Company: F. W. Leavitt, G. P. Cairns.

Henry Engineering Company: Thomas Henry, Edwin B. McBryde.

Harry Hicks Company: Harry Hicks, C. G. Thwaiter.

High Efficiency Electric Company: W. J. Shaw, Claude C. Corbet.

Hoover Suction Sweeper Company: Thomas F. Kelly, (Hamilton), Frank Ritz, (Toronto), Geo. T. White, (Windsor).

Hudson Electric Company: H. L. Hudson.

Hurley Machine Company, Limited: F. W. Chapman, Orm S. Johnson.

Hydro-electric Power Commission of Ontario: E. T. J. Brandon, H. G. Acres, Arthur H. Hull, B. O. Slater, G. T. Drewry, H. E. Madden, Tyrrell Ferrier, R. H. Bergh, G. H. Taylor, P. A. Borden, J. S. Parker, B. Mulholland, Thomas R. P. Flint, S. L. Eisenhofn, T. C. James, E. G. Gurnett, C. B. Stephens, W. G. Stephenson, (Hamilton), D. B. Fleking, R. R. Stevenson, A. V. Trimble, A. G. Hall, W. L. Amos, J. E. Skidmore, (Cobourg) J. H. Caster, H. J. Muehlman, J. W. Purcell, R. O. Quick, (Brighton), E. R. Lawler, J. J. Jeffery, H. D. Rothwell, H. C. Don Carlos, Branson Hall.

Keiths, Limited: C. R. Howard.

W. A. Kribs Co. Limited, Hespeler: Gordon Kribs.

Lancashire Dynamo & Motor Company: Sam. A. Gaskell, A. Powell.

Leslie Electric Company: Wm. H. Leslie.

Lincoln Meter Company: P. M. Lincoln.

Masco Company, Limited: C. A. McLean, A. C. Dilks, F. Haslett, C. J. Phelps.

Main Electric Company, Montreal: Jack Rosenthal.

Hugh C. MacLean, Limited: T. S. Young.

Macbeth-Evans Glass Company: J. U. Gault, J. F. Heffron, H. S. Quigley.

MacLean Publishing Company: W. T. Sutherland.

McDonald & Willson: C. H. Willson, W. F. Selby, H. V. Thompson, G. W. Barber.

Majestic Electric Supply, Limited: H. E. Doty.

H. K. McCann Company, Limited: J. W. Cambridge.

Messervey's, Limited: A. J. Duggan.

Moffat Electric Range Company: C. J. Rutland (Brantford).

Monarch Electric Company, Limited, Montreal: G. M. Wight.

Munderloh & Company, Limited, Montreal: J. A. Noice.

Moloney Electric Company: Geo. D. Leacock, A. J. Magley, (Windsor), J. Everard Myers: H. L. Weir.

National Electric Heating Company: C. M. Frankel, Leo Frankel, R. Senior, A. Pritzker, Roy H. Frankel, P. H. Fox.

National X-Ray Reflector Company: Norman B. Hickox, (Chicago).

Wm. Neilson, Limited: B. B. Jones.

1900 Washer Company: F. S. Babcock, H. H. Morris, H. W. Krug, G. Houlden, F. R. Funk.

Nitro Electric Company: G. H. Hilton, S. J. Brown, R. J. Devins, Wm. H. Russell.

Northern Aluminum Company: A. C. Johnston.

Non-Twist Canopy Ring Canada, Limited: F. D. Parmenter.

Norton Company of Canada, Limited, Hamilton: Edw. Van der Pyl.

Northern Electric Company: W. R. Ostrom, M. K. Pike, (Montreal), W. J. Clarke, H. H. McCurdy, C. W. Farran, W. S. Russell, J. J. Whelan, H. L. Wilson, James A. Daly, H. E. Ritchie, B. L. Baulch, (London), W. S. Ewens, A. L. Brown, W. H. Smedley, Carl W. Schade, James A. McDonald, Harry Beach, E. G. Hobbs, T. W. Watson.

Ohio Brass Company, Mansfield, Ohio: P. A. Hinds.

Ontario Safety League: J. F. H. Wyse.

Ontario Fertilizers, Limited: E. M. Grose.

Ohio Vacuum Cleaner Company: J. S. Grassick.

Packard Electric Company, St. Catharines: Frank T. Wyman, C. W. Spratt, F. A. Cornelius.

Parsons Electric Company: O. H. Forhan

Peter & Sylvester, Stratford: H. J. Peter.

Eugene F. Phillips Electrical Works, Ltd.: W. F. Wright, B. H. Prack: Harold H. Shotwell.

Radiant Electric Company, Grimsby: M. B. Tufford

Ramsden & Roxborough: J. G. Ramsden.

Reinhart & Doerr, Kitchener: Alex. J. Reinhart, W. C. Doerr.

Reliance Motor & Tool Company: Thomas L. May.

Renfrew Electric Products, Limited, Renfrew: E. H. Porte, Roy E. Harris, J. G. Emeler, (Toronto).

Richardson & Cross: Gordon G. Richardson, Geo. T. Cross.

Rogers Electric Company, Limited: G. McFadden, C. Cecil Tonkin, Weldon G. Rogers, G. T. Roach.

Rooks Electric Company: H. A. Rooks.

Rose & O'Hearn: Fred Rose.

Ross Electric Company: F. H. Bates.

Sangamo Electric Company: R. M. Scrivener.

J. H. Sandham Company, St. Catharines: J. H. Sandham.

Salisbury Electric Company: E. F. W. Salisbury, Fred L. Stewart, J. E. Curran.

Square D. Company: C. H. Keeling, W. R. McCallum, T. Tait.

St. Clair Electric Company: Charles E. Buente, R. Gordon Keast.

Standard Underground Cable Company: H. C. Barber, Norman R. Kirby.

Slater & Barnard, Hamilton: T. H. Barnard, W. N. Elliott.

Swedish General Electric Company: Charles C. Clark.

Swift Canadian Company: A. V. Piddington.

Toronto Art Glass Dome Company: S. F. Walsh.

Toronto & Niagara Power Company: C. F. Gilliatt, W. S. Bushell, Charles F. Barnes, H. H. Beasley.

Toronto Railway Company: W. R. McRae.

Toronto and York Radial Railway: W. C. Coulter, G. K. Hyde.

Turnbull Elevator Company: E. S. Headstrom.

Universal Electric Fixture Company: Wm. C. Carthy, J. R. Carthy.

United Electric Company: C. E. Walsh, "Red" Owens.

John F. Vaughan, Engineers, Boston: John F. Vaughan.

Wagner Electric Company: J. W. Beverly.

Wales Electric Company: A. Wales.

A. H. Winter Joyner, Limited: A. H. W. Joyner, M. B. Hastings.

Wood Electric Company: S. Wood, J. Fallon.

Whyte Sales Organization, Montreal: R. J. Whyte.

Hydro Municipalities

Belleville—Oswald H. Scott, G. B. Smith; Carleton Place—H. M. Millen; Chatham—J. G. Jackson, Anthony R. Hewitt, George W. Wands; Drayton—J. M. Davidson; Dundas—George E. Whiton; Dunnville—W. E. Swartz; Galt—R. Elliott, A. B. Scott; Guelph—Charles Drew; Hamilton—E. I. Sifton, W. H. Childs, W. Ellis; Ingersoll—H. G. Hall; Kitchener—V. S. McIntyre; London—E. V. Buchanan, G. W. Blay, J. W. Peart; Millbrook—Geo. F. Harrington; Milton—R. H. Crapper; Mimico—Thomas E. Bell; New Toronto—J. W. Cook; A. H. R. Thomas; North Bay—R.

(Concluded on page 54)

The Planks of the Goodwin Plan

Revised and Enlarged — A Foundation Upon Which We May Build an Industry of Colossal Proportions

1. Free and unobstructed flow of trade along the most economic channels, without attempt to arbitrarily direct it through fixed channels.

2. Open meetings of all trade associations, including meetings of executive committees.

3. The electrical press becoming an integral part of each division of the industry by honorary or associate membership. Unrestricted publicity should be given to the proceedings of all meetings.

4. That each trade division of the industry establish a code of practice outlining its methods, policies, etc., in dealing with other than divisions within the industry.

5. That each trade division of the industry prepare a code of ethics outlining its own functions, relations and responsibilities to each of the other divisions of the industry.

6. That proper accounting methods be applied in wholesale and retail merchandising, particularly if either function is a minor department of a company. The cost accounting of each department should be kept separately so as to carry its own overhead.

7. A strong and representative National Association of Electrical Contractors and Dealers, and urges all interests to lend immediate assistance to this end.

8. Recognition of the service functions of the contractor-dealer with a differential based upon the value of the service rendered.

9. Improvement in retail merchandising methods, better display and the encouragement of more retailers—hence more points of retail contact—by urging present contractors to open retail stores, thereby enlisting the support of central stations and jobbers, and offering a broader and larger outlet for manufacturers.

10. Encouraging the sale of high-grade electrical material, the establishment of high-class specialty retail shops, improved specifications in wiring installations; and the introduction and liberal use of convenience receptacles.

11. Application by retailers of intensive sales methods in connection with small devices and appliances used in the home, factory, office, etc. (such as washing machines, vacuum cleaners, dish washers, electric ranges, electric heaters, household heating devices, sewing machine motors, fans, lamps, portables, fixtures, vibrators, hair dryers, ice machines, etc.)

12. That all interests conducting retail departments operate them at a profit. The adoption of this policy on the part of central stations and jobbers will result in a large number of concerns entering the retail field.

13. That central stations conducting retail departments for the sale of lamps, appliances, devices, portables, etc., should operate them in accordance with the ethics of retailing, and with full regard to proper cost accounting and best economic methods.

14. The determining by jobbers through proper cost accounting, of the cost of warehousing and selling principal commodities so that each such commodity may carry its proper proportion of overhead based upon volume, selling expense, turnover, etc.

15. That the service function of the jobber be recognized in the distribution of supplies with a differential based upon the value of the service rendered.

16. Recognition of the value to the public and to the industry, of professional services in connection with engineering problems, and the formation of a national association by consulting engineers, so that they may co-operate effectively with the other divisions of the industry in defining the functions of the several divisions.

17. The continuance, so far as practical, of the work of the various war-service committees as relating to standardization, reduction or elimination of unnecessary types and styles of distributing materials and devices.

18. Standardization wherever practical of materials, devices, appliances and in particular, plugs and receptacles and similar devices used in homes and offices, or where handled by the general public.

19. Broader education of the public concerning the problems of the electrical industry, and concerning electricity, its use and the application of household devices.

20. The formation of a national lecture bureau, with state and local staffs. The function of the staff would be to carry on educational work within the industry and before public gatherings. Service to be gratuitous.

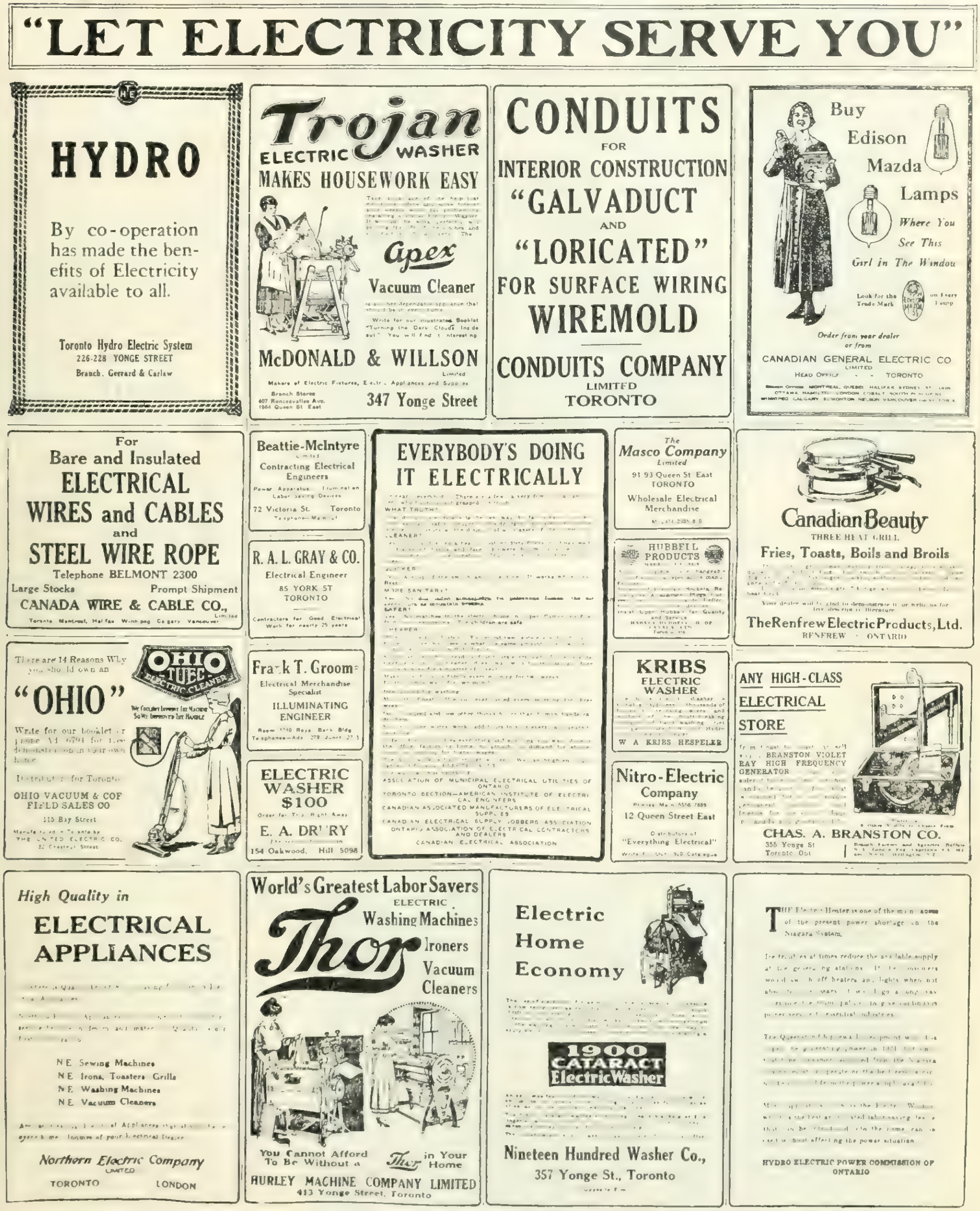
21. Recognition of the principle that any action taken by one division of the industry which affects another is seldom satisfactory unless each division affected is represented.

22. The appointment of committees by the various electric light associations, the Electrical Supply Jobbers' Association, the National Association of Electrical Contractors and Dealers, the American Institute of Electrical Engineers, the Associated Manufacturers of Electrical Supplies, the Electric Power Club, and such other associations as may be interested, to meet together to study the problems of the industry and to co-operate in finding their solution.

23. Consolidating or reconstructing overlapping organizations. A committee comprising representatives from each association should be formed to study this question and submit a plan.

24. Eventually a single organization in the electrical industry, consisting of national, division, state and local sections, with national group sections for solution of problems affecting the several sections or groups of the industry.

25. An appreciation of the responsibility which rests upon every individual and group in the electrical industry to render to the public, in the fullest way, the great service which the electrical industry alone can perform in increasing production, reducing the high cost of living, and augmenting human efficiency and comfort. Here, we believe, is a supreme purpose which—like the winning of the war—should inspire the untiring effort and earnest co-operation of every electrical man everywhere, until the great "job" of electrifying all industry and all the processes of living is accomplished.



"LET ELECTRICITY SERVE YOU"

HYDRO

By co-operation has made the benefits of Electricity available to all.

Toronto Hydro Electric System
226-228 YONGE STREET
Branch, Gerrard & Carlaw

Trojan
ELECTRIC WASHER
MAKES HOUSEWORK EASY

Apex
Vacuum Cleaner

Write for our illustrated Booklet "Turning the Dark Clouds Inside out." You will find it interesting.

McDONALD & WILLSON
Limited
Makers of Electric Fixtures, Electric Appliances and Supplies
Branch Stores
407 Roncesvalles Ave.
1964 Queen St. East
347 Yonge Street

CONDUITS
FOR
INTERIOR CONSTRUCTION
"GALVADUCT
AND
"LORICATED"
FOR SURFACE WIRING
WIREMOLD

CONDUITS COMPANY
LIMITED
TORONTO

Buy Edison Mazda Lamps
Where You See This Girl in The Window

Look for the Trade Mark on Every Lamp

Order from your dealer or from
CANADIAN GENERAL ELECTRIC CO
LIMITED
HEAD OFFICE - - TORONTO
Branch Offices: MONTREAL, QUEBEC, HALIFAX, SYDNEY, ST. JOHN, OTTAWA, HAMILTON, LONDON, COBALT, SOUTH PORCUPINE, WINNIPEG, CALGARY, EDMONTON, NELSON, VANCOUVER, VICTORIA

For
Bare and Insulated
ELECTRICAL
WIRES and CABLES
and
STEEL WIRE ROPE
Telephone BELMONT 2300
Large Stocks Prompt Shipment
CANADA WIRE & CABLE CO.,
Limited
Toronto Montreal Halifax Winnipeg Calgary Vancouver

Beattie-McIntyre
Limited
Contracting Electrical Engineers
Power Apparatus, Illumination, Labor saving Devices
72 Victoria St. Toronto
Telephone—Main [illegible]

R. A. L. GRAY & CO.
Electrical Engineer
85 YORK ST
TORONTO
Contractors for Good Electrical Work for nearly 25 years

EVERYBODY'S DOING IT ELECTRICALLY

ASSOCIATION OF MUNICIPAL ELECTRICAL UTILITIES OF ONTARIO
TORONTO SECTION—AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS
CANADIAN ASSOCIATED MANUFACTURERS OF ELECTRICAL SUPPLIES
CANADIAN ELECTRICAL SUPPLY JOBBERS ASSOCIATION
ONTARIO ASSOCIATION OF ELECTRICAL CONTRACTORS AND DEALERS
CANADIAN ELECTRICAL ASSOCIATION

The
Masco Company
Limited
91-93 Queen St. East
TORONTO
Wholesale Electrical Merchandise

HUBBELL PRODUCTS

Insist Upon Hubbell for Quality and Service

Canadian Beauty
THREE HEAT GRILL
Fries, Toasts, Boils and Broils

Your dealer will be glad to demonstrate it or write us for free descriptive literature.

The Renfrew Electric Products, Ltd.
RENFREW - ONTARIO

There are 14 Reasons Why you should own an
"OHIO"
Write for our booklet or phone Ad. 6794 for free demonstration in your own home.

Distributors for Toronto
OHIO VACUUM & COFFIELD SALES CO
115 Bay Street
Manufactured in Toronto by
THE UNITED ELECTRIC CO.
22 Chestnut Street

OHIO TUEC ELECTRIC CLEANER
We Couldn't Improve The Machine So We Improved The Handle

Frank T. Groome
Electrical Merchandise Specialist
ILLUMINATING ENGINEER
Room 1210 Royal Bank Bldg
Telephones—Adel. 279 Junct. [illegible]

ELECTRIC WASHER
$100
Order for This Right Away
E. A. DRURY
154 Oakwood. Hill 5098

KRIBS
ELECTRIC WASHER
W. A. KRIBS HESPELER

Nitro-Electric Company
12 Queen Street East
Distributors of
"Everything Electrical"
Write for Our 1920 Catalogue

ANY HIGH-CLASS ELECTRICAL STORE

BRANSTON VIOLET RAY HIGH FREQUENCY GENERATOR

CHAS. A. BRANSTON CO.
355 Yonge St
Toronto Ont

High Quality in
ELECTRICAL APPLIANCES

N.E. Sewing Machines
N.E. Irons, Toasters, Grills
N.E. Washing Machines
N.E. Vacuum Cleaners

Northern Electric Company
LIMITED
TORONTO LONDON

World's Greatest Labor Savers
Thor
ELECTRIC
Washing Machines
Ironers
Vacuum Cleaners

You Cannot Afford To Be Without a Thor in Your Home

HURLEY MACHINE COMPANY LIMITED
413 Yonge Street, Toronto

Electric Home Economy

1900 CATARACT Electric Washer

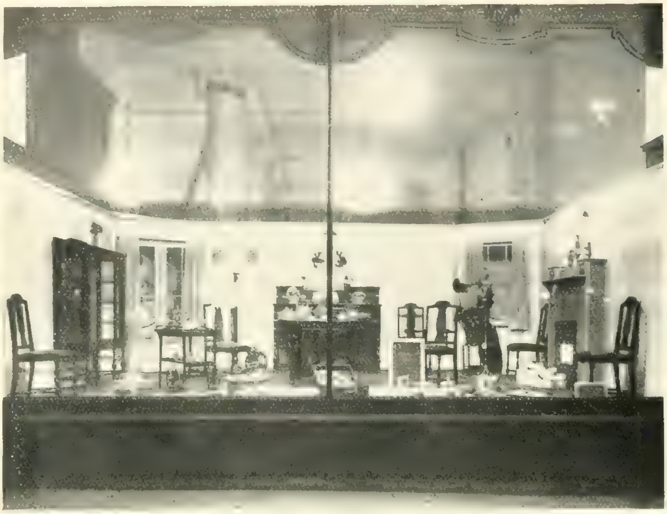
Nineteen Hundred Washer Co.,
357 Yonge St., Toronto

THE Electric Heater is one of the main causes of the present power shortage on the Niagara System.

Ice troubles at times reduce the available supply at the generating stations. If the consumers would switch off heaters and lights when not absolutely necessary, it would go a long way to relieve the situation and to give continuous power service to essential industries.

HYDRO ELECTRIC POWER COMMISSION OF ONTARIO

Miniature reproduction of the Electric page which appeared in the five Toronto daily papers on January 15 and 16



First Prize

In our "Best Window" contest the first prize goes to Mr G Desnoyers, head window trimmer with the Montreal Light, Heat & Power Company, who designed the handsome display shown herewith. The background is beaverboard painted in two shades of blue, with stenciled design in panels, blue silk curtains at door and window and blue oriental rug. The dining set is walnut, which makes a fine contrast with the light background

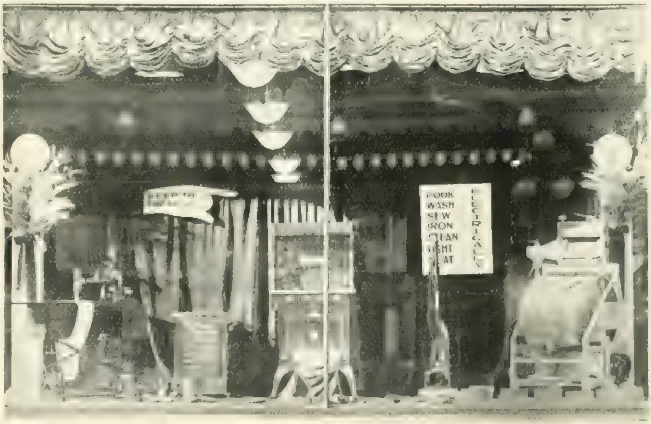
Our "Best Window" Contest

WINNERS:

1. **G. Desnoyers, Montreal Light. Heat and Power Company.**
2. **F. S. Beaumont, Toronto Hydro-Electric System.**
3. **Mohawk Electric Co., Brantford, Ont.**
4. **George J. Haid, Preston, Ont.**

JUDGES:

J. Herbert Hall, Conduits Limited.
Jos. Rogers, Rogers Electric Co.
R. A. L. Gray, R. A. L. Gray & Co.

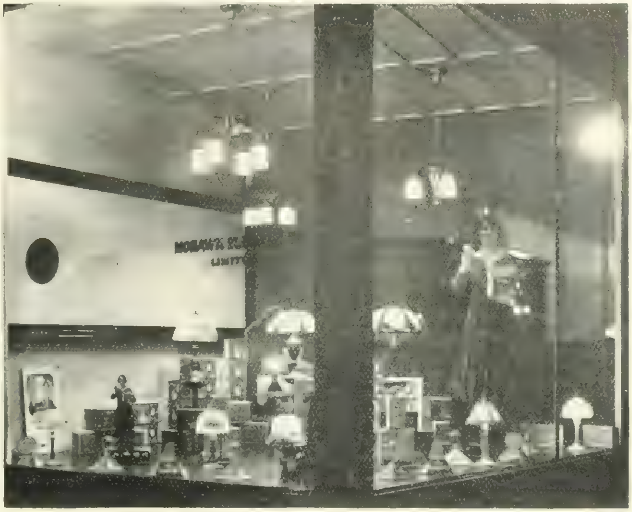


Second Prize

The second prize goes to Mr. F. S. Beaumont, of the Toronto-Hydro-electric System. The judges were of the opinion that, in this display, there was a strong appeal to the passerby to come in and make enquiry. The card explaining the number of household duties that can be performed electrically stands out prominently, while there is just enough ambiguity in the "Keep to the right" sign to arrest attention.

Third Prize

The Mohawk Electric Co. of Brantford, take third place in the "Best Window" contest. This firm have taken advantage of the manufacturers' "Helps" that are proving so valuable in assisting display. One of the judges remarked that it seemed a pity not to show a greater variety of appliances, but it was voted by all a well dressed window.



What About Your Inventory?

Do you know what business you are doing, what your profits are, or what lines aren't moving fast enough or do you just guess at it? Progressive dealers of today take an inventory of their stock at least once a year, because they know it pays.

It isn't necessary to take it at the beginning of the year, it can be taken at any time but try and take it at about the same time each year.

Perhaps you require more capital to handle your business and you go to the bank to arrange for it, the bank will certainly want to know what business you have done this year, what stock you have on hand and what your profits have been. Can you tell them? Not unless you have taken an inventory.

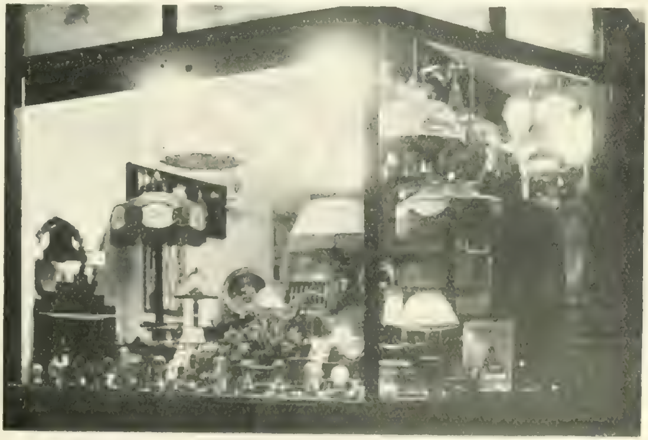
Or again you may be looking around your store and notice some goods that have been there perhaps for two or three years, its just the same as if you had left so much money lying there for the same length of time, and idle money means a loss. An inventory would have shown you this condition before and you could have started your money working.

It isn't necessary to sell these goods at a loss, take them off your shelves and display them in your store windows, they will soon start moving.

Resolve in the future to take an inventory regularly, and what is just as important keep your books up to date.

Fourth Prize

To Mr. George J. Haid of Preston, the judges awarded the fourth prize. Mr. Haid deserves the more praise, in that he has just recently opened his store. If one may criticize, it would be, we think, that the display is rather crowded, though it is fair to suggest that the photo does not do the subject justice. [illegible]



Conditions in the Electrical Industry in England

The following statement has been received from Mr. F. W. Field, British Trade Commissioner in Ontario, and is based on information forwarded by the British Government's Department of Overseas Trade:

Electrical Industries

All branches of the electrical industries continue to be fully occupied with work, and manufacturers are engaged in further equipping themselves for increased output and the development and extension of business.

Anglo-Swiss Combination.—An important transaction has just been made by Vickers, Ltd., which will greatly strengthen their interests in Europe where electrical business is concerned. This company, it will be remembered, recently acquired the American Westinghouse Company's interests in the Continent of Europe, following upon their amalgamation with the Metropolitan Carriage, Wagon and Finance Company. They have now come to an arrangement with the well-known Swiss firm of Brown, Boveri & Co., of Zurich (which recently obtained a contract valued at £106,618 from the Edinburgh City Council against English competitors). Under the new arrangement Vickers obtain exclusive rights to the patents of the Brown, Boveri Company for the United Kingdom and the Colonies, while at the same time the two electrical firms will work together in Eastern Europe, France and Italy.

Vickers have agreed to subscribe a substantial sum towards the Brown, Boveri Company's new shares, which will shortly be issued. German firms formerly had almost a monopoly of electrical work in Europe, and this new arrangement should result in a larger portion being obtained for the United Kingdom.

Consolidation of Interests.—The English Electric Company, Ltd., announce that they have bought the works of the Siemens Bros., Ltd., at Stafford. The agreement provides for the preferential exchange of the special products of each company, and the comprehensive nature of the operations of the purchasing company can be gathered from the fact that it already represents the consolidation of the interests of such well-known undertakings as Dick Kerr, the Coventry Ordnance Works, Willans and Robinson, and the Phoenix Dynamo.

An issue of £360,000 shares of £1 each is being made by the Edison-Swan Electric Company, Limited, whose total authorized capital is close upon £2,000,000. This company became established in 1883 for the primary purpose of manufacturing incandescent electric lamps, and for many years held the monopoly in the manufacture and sale of the Ediswan lamps. Subsequently, a general electrical engineering business was inaugurated and the manufacture of metal filament lamps was also started. The company's works include a large glass factory, capable of an output of 15 million electric lamp-bulbs per annum, and a gas plant of a capacity of 50 million cubic feet of gas per annum. In addition to electric lamps, a wide range of electrical goods is produced, and during the past year the company have taken an important financial interest in the Enfield Ediswan Cable Works Ltd., manufacturers of electrical cables and wire. The company are also sole agents for the "Sangamo" Electric Meter for the United Kingdom and the Colonies. This meter will in due course be manufactured in the United Kingdom.

Lamps.—Up to the late summer, lamp manufacturers had practically no exportable surplus, their overseas sales [illegible] demands of their old customers abroad. Production is now overtaking home consumption, and more interest is being taken [illegible] works extensions which are coming into operation. The director of the Electric Lamp Manufacturers' Association has stated that five of the firms in the Association have made excellent progress in the production of electric lamps of the half-watt (gas-filled) type, and are confident of being able to satisfy the home demand. One of the firms is indeed seeking export orders.

Wires and Cables.—The electrical wire and cable manufacturers have recently found increasing difficulties over both their home and export trade. They are unwilling to quote firm deliveries, and with large orders find it necessary to stipulate that their quotations may have to be increased. Difficulties have arisen in connection with the supply of raw materials, demands for higher wages and dislocation of transport. There is no lack of enquiries from export markets. The cable manufacturers claim that relatively to the increased cost of raw material and labor their prices compare favorably with those ruling prior to the war. It is said that the present price of rubber-covered wires, despite the very much higher cost of certain raw materials, are only about 12 per cent. above pre-war rates.

The lines in which noteworthy progress has been made by electrical wire and cable makers during the war are in the manufacture of:—

Enamelled wire,
Silk and cotton-covered wire, and
Insulating tape.

Makers of these goods are planning to increase their output of high tension power cables of 20,000 to 30,000 volts.

Electrical Transformers for Collieries.—One of the most recent developments of electrical practice in mining is the use of transformers for underground work in collieries. In this connection a new type of colliery transformer—for use actually in the pit—has been designed by the Metropolitan-Vickers Electrical Co. (formerly the British Westinghouse Co.), of Trafford Park, Manchester, and recently placed upon the market. The new type has been developed with a low overall height, making it suitable for passage in the pit. It is mounted on wheels fitted to run on any gauge of track.

Jockey Pulley Motors.—Electromotors, Ltd. (Openshaw, Manchester), are manufacturing a special form of these motors for use in cases where in arranging an electric drive it is most convenient to fix the motor close to the driven shaft, such, for instance, as in driving printing machines. The arrangement is said to give very "sweet" drive and often results in a material saving in first cost.

Power Recording and Index Thermometers.—The Cambridge recording and index thermometers are widely employed for many industrial purposes, and are particularly suitable for power plant use. The majority of temperatures which require to be measured in power plant come within

The programme provided for the session of the convention on the afternoon of Thursday, January 15, being devoted to general discussion following the business meeting and the election of officers for the coming year. Mr. P. B. Yates, manager Public Utilities Commission, St. Catharines, submitted the following, which refers to subjects of general interest:

The Lindsley Bros. Canadian Co., Ltd.

The Lindsley Brothers Company of Spokane, Wash., dealers in Western and Northern cedar poles, Douglas fir cross-arms, posts, ties and piling, will in future be known to the Canadian trade as "The Lindsley Brothers Canadian Company, Limited." They are changing their Canadian method of organization and will conduct all their future [illegible] under the above title with headquarters at Nelson, B. C.

No Fish in the Sea

By Ervin J. Trojan*

Early morning in Oakbranch; Oakbranch is located on the main line, about thirty miles from the big town, and its main attractions are the planing mill, the er—well, the planing mills. The stationmaster was sprinkling the platform; the sun, only a few hours high, dried up the water in small clouds of vapor almost immediately.

Reclining in a chair placed at a precarious angle against the shady side of the station, sat Zeke Stoutch, in company with a few other disciples of inertia, who made it a daily routine to welcome the 7.53 local. They were sprawled under the few trees on the grassy plot at the side of the station, on benches, on baggage trucks, on the platform against the station; making it necessary for the stationmaster to be very discriminating in his sprinkling.

Far to the west, just beyond where the shiny twin lines of steel merged into the quivering, hazy horizon, a small white cloud of smoke curled lazily upward; an instant later a low, insistent hum rose from the rails, contrasting with the snarling whine of the mills. The self-appointed reception committee glanced at the clock; 7:52; yessir, the local was on time.

The engine stopped at the water tank; this brought the rear car opposite to where Zeke was sitting. A passenger at an open window, aroused by the bustle and noise, looked up from the magazine he had been reading. He caught Zeke's eye and grinned; then, just as the train pulled out, threw the magazine, neatly and accurately, into Zeke's lap.

Late Saturday afternoon in the Oakbranch planing mills. The men have all gone home, and the plant wears that quiet deserted air that makes one feel it must be Sunday. Judson Cameron, the plant superintendent, had gathered all the loose papers on his desk in a heap and slammed the top down. Zeke just then came in, ready to perform his arduous task of watching the grounds till Monday morning.

Zeke Goes Hunting

"Hello, Zeke," Cameron nodded greeting. "Close the north track gate before night. There are some city newspapers if you feel like reading. When are you going to try that scheme you told me about?"

"Well, sir, I come down earlier to-day, so's to have the light to help me. I have a notion I'll find a dozen of them there safety hints before dark; yessir; that feller on the train give me a chance to get some easy money when he threw me that there magazine."

"Go to it, Zeke; I'd gladly find unsafe conditions before an accident happens, prize or no prize. Find as many as you can, and if they are good I'll O. K. them and send them in to the Safety Contest you read about; as I told you before, I'll pay you double any prize money you may win with them; I'll make that offer to the men on Monday. Well, so long, Zeke."

"Good-night, sir; by Monday there won't be no more of them safety hints to make. I reckon I'll get 'em all. Good-night, sir."

Once alone, Zeke fished out the now dog-eared magazine and read the rules of the contest again. The editors offered cash prizes for the greatest number of safety suggestions made by workers in any line, the only condition being that the department heads must give approval of the actual worth of the suggestions. Zeke's comprehension of the spirit of safety was limited to the sign at the railroad crossing which shrieked in crimson letters "Safety First"; but by studying some of the accepted suggestions published in the magazine, he gained an idea of what was wanted; the thing seemed very simple. An hour or two of searching, he felt, would net him some easy money. Zeke was not a safety enthusiast; nor a convert; but he could look at very few things without finding fault with them, and that apparently, was all that was required. So he placed a pencil, carefully sharpened, behind his ear, and a large pad of scratch-paper in his hip pocket, and set out on his safety hunt.

Zeke opened the door leading from the office to the stair-shop; in his eagerness he failed to notice the door was only five feet high with a step on the other side, but was reminded of it violently.

"Rot the luck," he muttered, glaring at the offending door. "I went through there a thousand times without never bumpin' into it."

He stopped under a bench to pick up his pencil, and scratched the back of his neck on a nail protruding through the bench top; as he recoiled from the unexpected pain he stepped on a loose end of a flooring board; it had been supported by a makeshift cross-piece underneath, which had broken loose. Zeke lost his balance and fell.

"Doggone that feller Mike! Why don't he fix them floors right? 'Twouldn't take but a few minutes; he's the laziest man I ever see."

Everything "Safe" So Far

Zeke's ardor was considerably dampened by these mishaps; growling imprecations on that careless feller, Mike, he carefully scrutininzed every nook and corner of the stair-shop for unsafe conditions, and emerged at the south door with his scratch pad still barren of any prize-winning suggestions.

He then crossed the yard, entered the moulding shop, and gazed about him, determined to find something. Over near the wall hung a rack containing short lengths of mouldings so placed that some of the ends of moulding projected into an aisle. Zeke's attention was called to it by having his hat brushed off as he went by; here seemed to be a good one; Zeke picked up his pencil again, stepped back a pace, and reached into his pocket for the scratch-pad. This manoeuvre brought his elbow into very close contact with the hard, unyielding bed of a bandsaw.

"Why in tarnation do they call it a funny-bone?" howled Zeke, after he had ceased heaping anathemas on the inanimate bandsaw. "Seems like this is my Jonah day. It's no funny business hittin' it. Drat such foolishness. I bet Cameron knew like as not I'd get all bunged up snoopin' around like, and is laughin' himself sick."

A stray beam of light from the setting sun shone on a drop cord hanging from the ceiling and brought sharply into view a few strands of bright green threads; the cord might be worn and set fire to the place, some day. Zeke had read of just such a suggestion in that very magazine. With a view to investigating the matter further, he brought a ladder and placed it under the cord; the fourth step from the bottom was loose and percariously shaky.

"Seems to me," growled Zeke, as he doubtfully placed his weight on that step, "that a factory this size could afford a better ladder nor this one; which has been fallin' apart for the last—"

At this moment the step gave way, allowing Zeke to bark both shins and bump his chin with considerable force. He clasped his chin with both hands and hopped first on one foot and then on the other, the while he voiced his unfavorable blankety-blank opinion of the world in general and everything in it. After he had done this and had kicked the vicious ladder through a window, thereby almost disjointing a toe, he felt much better.

"This here consarned, dratted tom-foolishness is too much!" he said wrathfully. "I'd get myself killed on this crazy business; serves me right for lettin' myself get stung that way. I might have knowed nobody would give money away if it was that easy to get. That safety contest is just plain humbug, and Cameron knowed it; he egged me on a-purpose to have a laugh on me. I'll show him! I won't say nothing about this to him, darn him."

---

*Publication Department, Commonwealth Edison Company

He carefully adjusted the broken step and stood the ladder in its accustomed place. "I bet Cameron would laugh himself into a fit if I was to tell him how I skinned all the bark off my shins; no, sir. Take that!" and he savagely threw the scratch-pad at a cat.

Painfully Zeke eased himself down on the grass under a tree in front of the office, filled his pipe, and scowled ferociously straight ahead, thinking disagreeable thoughts of the editors of that there safety magazine, the man who had given it to him, Cameron, who had egged him on, and lastly, himself.

"Good-morning, Zeke, good-morning. How are you?" Cameron greeted the still scowling Zeke cheerfully. "Let's have all those suggestions you made over Sunday. Without seeing them I'll give you a dollar for each one, extra."

"There ain't none," growled Zeke. "If there was any to make I would have seen 'em long before. I figured it was no use, so I didn't look for any."

Cameron laughed.

"Think so, Zeke. Well, keep your eyes open and let me know if you ever see anything. I'm glad you gave me this idea, though; I'll put it up to the men to-day; but remember you had first chance."

"Which I don't care at all," said Zeke, moving off slowly. "Well, I guess I'll go and see the 7:53 pull in. So long." —Safety Bulletin.

Influence of the Trade Journal

The following letter from the Public Library of New South Wales, Australia, is further evidence of the great value of trade publications in disseminating information regarding the manufactures and resources of Canada:

Sydney, 17th November, 1919.

Publishers Canada Lumberman,
347 Adelaide St. West, Toronto.

Dear Sirs:

We have in this Library a particularly fine collection of trade publications, including most of the important trade journals published in England and America. Many of these are forwarded regularly as donations from publishers and directors of trade corporations, who recognize that there is no better way of advertising the manufactures and resources of a country than by providing a complete and up-to-date file of trade and commercial literature in the leading libraries throughout the world.

W. A. Ifould,
Principal Librarian.

Moving Days are Coming

Why not endeavor to get some of the electrical business that usually results from people moving from one house to another, especially is this true during the months of April and May.

People moving out of a house will require to have their fixtures taken down and will want them put up in their new home. After you have taken down the fixtures in a house leave your business card or some other form of advertising giving your address and phone number. If you have one, follow it up in a day or so by a personal call if possible.

People moving into another very often find that they require extra fixtures or appliances or the ones they have are unsuitable, your chance of getting a good share of this business is good, if you are wide awake.

Its a good plan to keep in touch with the Cartage Co' and Real Estate agents in your locality, they usually know what changes are taking place.

Go after the business it will pay you.

No Delay in Delivery

The Electrical Engineers Equipment Company, Chicago, recently sustained damage to their offices by fire. Fortunately, however, the company is able to carry on as usual as the following letter to their customers indicates:

To Our Customers

We regret to inform you that our general offices located at 710-714 W. Madison Street, Chicago, Illinois, was damaged by fire on the night of January 13, 1920.

Our manufacturing, stock and shipping departments, located at 711-715 Meridian Street, were not affected by this fire, and are operating, as usual, at full capacity.

For several days you may find that we will be slightly delayed in answering your correspondence. We are using our best efforts to get our office systems back in normal shape. In the meantime we ask your kindest indulgence.

There will be no delay in shipment of orders now in production and any new orders which you may favor us with will be shipped with usual promptness.

Do not hesitate to call upon us for any service which we have been furnishing you in the past. Our productive departments are still intact and able to render you our usual prompt serivce.

If you have sent us any orders, requests for quotations, or other important correspondence within the last few days, will you kindly give as a duplicate of the same. All mail should be addressed to 711-715 Meridian Street, Chicago, Ill., until further notice.

We wish to take this occasion to thank you for past favors and hoping to have the opportunity of continuing to serve you, we remain,

Yours very truly,

ELECTRICAL ENGINEERS EQUIPMENT CO.,
Chicago, Ill.

January 14, 1920.

Who Was at the Banquet?

(Concluded From Page 47)

H. Stafford; Oshawa—A. T. Hicks; Owen Sound—W. J. McLinden; Peterboro—H. O. Fisk; Picton—W. Tait; Preston—V. P. Bernhardt; Sarnia—J. E. B. Phelps; Strathroy—E. H. Smithrim; Sudbury—R. H. Martindale; Toronto—H. H. Couzens, R. S. Lee, W. C. Burch, Geo. K. Archer, H. P. L. Hillman, C. E. Schwenger, A. W. J. Stewart, F. W. Peasnell, C. W. Fatt, J. B. Kitchen, E. H. Ryan, N. T. Fisher, H. J. McTavish; Waterloo—George Grosz; Windsor—O. M. Perry; Woodstock—J. G. Archibald.

Others presnt included the following: J. E. Stanley Lewis, Ottawa; T. E. Fletcher, W. J. Hall, M. J. Higgins, Stratford; Charles M. Pritzker, J. M. Enushevsky, N. H. Hagen, Kitchener; J. J. Heeg, Guelph; A. T. Brookes; Wills Maclachlan; Thomas G. Jackson; R. E. Holditch; Wm. Bennett; T. G. Bennett; Geo. Armstrong; James T. Gunn; P. W. Lyon; Douglas Stuart; V. K. Stalford, Hamilton; E. Warman; F. G. Stroug; R. G. Black; Henry E. Alrite, Brantord; F. H. Harrison; Frank, T. Groome; W. M. Andrew; Charles Leacock; C. W. Fraser; Fred H. Palmer; W. L. Lundy; O. H. Caldwell, New York; G. E. Davenport; A. C. McLean, Brantford; H. Macdonald; Harry A. Black, Cobourg; G. Attwell; A. C. H. Orpen; R. A. Sara, Montreal; Professor H. W. Price; W. A. Lefane, Windsor; C. E. A. Carr; H. H. Angus; L. A. Cryan, Brooklyn, N. Y.; Richmond Seabury, New York.

New Electric Automobile-Engine Heater

Keeping an automobile engine warm during normal winter weather, as the car stands in the garage, an electric auto-engine heater recently placed on the market fills a long felt want of automobile owners. It comprises one of the latest additions to the list of appliances made by the Westinghouse Electric & Manufacturing Company of East Pittsburgh, Pa. By the use of this method, the heat is concentrated at the engine and carburetor, where it will do the most good. Thus, on cold mornings, no difficulty will be experienced in starting the engine, as the temperature of the latter will always be well above that of the outside air. The appliance is ruggedly built and practically indestructable. The heating unit is protected by a strong perforated sheet-metal guard entirely surrounding the heater. A rigid metal hook allows the heater to be hung anywhere under the hood. The flexible cord is long and the plug can be attached to any lamp socket. Altogether, it is well-built with no delicate parts to get out of order. The power consumption is only 100 watts. The initial cost and the expense while in use are both small as to be almost negligible.

New Trade Publications

Portable Belt Conveyors for handling material horizontally or at a slight incline are described and illustrated in a new folder entitled "Type B Portable Belt Conveyors." This folder, just published by the Portable Machinery Co. of Passaic, N. J. contains prices of these machines which are made with 16 in. wide belt and in standard stock sizes as follows: 12 ft.-6 in.,16ft., 19ft.-16 in., 23ft., 16ft.-6in., 30ft., 33ft.-6in. and 37ft. These machines in addition to being used for handling coal, sand, crushed stone, fertilizer, etc., are being used for conveying many manufactured products, bagged material such as cement, etc. Used in series or in conjunction with fixed conveying system, they afford a flexiblt, convenient and automatic conveying arrangement.

I.E.E. Wiring Rules

The Council of the Institution of Electrical Engineers have approved the following recommendation of the wiring Rules Committee:

"That Wiring Rule 39 be amended to read as follows:

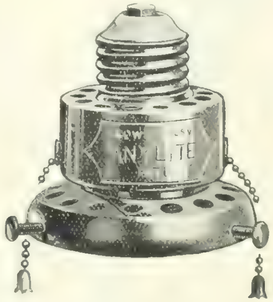
39. Except for wiring fittings, the cross-sectional area (Table. Col. 2), of any copper conductor must not be less than 0.0015 square inch (diam. 044".) The cross-sectional area of fittings wires must not be less than 0.0010 square inch (diam. .036 inch)."

The matter is one of importance in view of the [illegible] of the new standard sizes and the question has been raised in correspondence with the Institution and in the press.

A complete revision of the Wiring Rules is in hand and the Committee will be glad to receive suggestions (in the form of specific amendments) for consideration during the revision. Suggestions should be addressed to the secretary of the Institution, 1, Albermarle Street, London W. 1. Many valuable suggestions have already been received.

New Feature in Light Control

The Dominion Battery Co. Ltd., of Toronto, Can., have recently introduced an interesting feature in the design of their light controller, known as the "Uno Thread." Leading socket makers having adopted this thread, the Uno shade holder is now a standard fixture, its attractive appearance and practical utility being generally recognized. The Any-lite now possessing this standard device in addition to its former established features of chain pull socket and a "dimmer" capable of a wide range of light control, has gained for itself a position in the front rank of modern electrical appliances. The same company is also making a specialty of their 32 volt-40 watt "dimmer" for farm lighting plants.



A Costly Change

Legislation changing the rule of the road from the left to the right will be introduced at the next session of the British Columbia government. It is estimated that it will cost half a million dollars for the British Columbia Electric Railway to make the necessary changes in their cars, switches and overhead equipment.

Association of Professional Engineers

Application will be made to the Legislative Assembly of the province of British Columbia at the next session on behalf of the Association of Professional Engineers of British Columbia for a private bill to be known as the British Columbia Engineering Profession Act for the purposes of governing and regulating the practice of civil, mining, metalurgical, mechanical, electrical and chemical engineering in that province, the qualification, examination and registration of intending practitioners, discipline of members and so on.

The Herbert Morris Crane and Hoist Company, Niagara Falls, Ont., are distributing a folder entitled Morris Worm Gear Chain Blocks. One of the illustrations shows a 10-ton chain block carrying a 15-ton, (2240 pounds per ton), test load.

Aqua Electric Water Heater

The illustration herewith shows the "Aqua" electric water heater being distributed to the Canadian trade by Mora and Mendoza, 111 Broadway, New York City. This heater is designed to be permanently attached to the water supply system and it is claimed that hot water is instantly available by turning the faucet to the right, while cold water is secured when the faucet is turned to the left. It is not a "lamp socket device." Further particulars will be furnished on request to Mora & Mendoza.

New Industry for Brantford

It is announced that Brantford, Ont., has been successful in bringing to that city a very promising industry. This is the Canadian factory of the "Bluebird" Electric Washing Machine, which, up to the present time, has been manufactured only in St. Louis, Mo. The Canadian company will be known as the Bluebird Manufacturing Company of Canada, Limited, and the present intention is that this shall be the headquarters for manufacturing these machines for distribution throughout the British Empire. A factory specially adapted for the work, has already been taken over from Motor Trucks, Limited, and it is expected that actual production will have commenced within three months. The men behind the new enterprise are the directors of Motor Trucks, Ltd., Messrs. J. B. Detwiler, R. E. Secord, W. J. Verity, W. C. Boddy and T. Hendry. These men have associated with them Mr. C. D. Henderson of the well known firm of Cowans Limited, Brantford. It is prophesied thatt 30,000 machines will be turned out during the first year and that the capacity will gradually be increased to 100,000. The plant of Motor Trucks, Limited, is a one-storey building of large area, which lends itself admirably to the Ford plan of production on a continuous line, from the entry of the raw material to the finished products in crates for shipping.

The Roller-Smith Company, New York, have ready for distribution Bulletin No. 420, which describes and illustrates some new instruments—the Junior Imp., a.c., ammeters and voltmeters, up to 50 amps. and 150 volts; the 4 in. Imp. a.c., ammeters and voltmeters, up to 50 amps. and 300 volts, and the 4 in. Imp. a.c., wattmeter with maximum capacity of 50 amperes and 300 volts.

The Associated Electrical Interests of Montreal are planning a "Get Together" on February 18 and 19. W. L. Goodwin will be there.

Our Sporting Column—By G. D. L.

On New Year's morning the first game of the series of hockey matches to be played this season for the Frank Dryden Cup was played on the Aura Lee Rink. The line-up was as follows:

Rand Rocks	Place	Westinghouse
Bowman	Goal	Orr
Southie	Point	Taylor
Skelton	Cover Point	Cooch
Fraser	Rover	Schultz
Wood	Right Wing	Leslie
Plank	Centre	Allen
Cramer	Left Wing	Harris
Ackman	Spare	Turnbull
		Hopper
		Miss McTyre
		Miss Phillpot
		Whitman
		Lovell
		Gibbs
		Simmons
		Sheppard

Timekeeper, Burch. Referee, Geo. D. Leacock.

Score —Westinghouse, 4; Rand Rocks, 3.

The game was very fast from the time the referee sounded the whistle to commence play, until he again sounded it declaring the last of the period.

Bowman's work in goal was particularly brilliant, at times when he almost stopped the puck, making an exceptionally spectacular stop in the last quarter by stopping a fast shot from Cooch which barely missed the goal by six feet.

The public were not disappointed in Southie, and although closely checked by Cooch, he would secure the puck and carry it a distance of three or four feet before falling down. At the end of the first quarter the score stood 1—1, the Rand Rock still being favored in the betting.

In the second quarter, Hopper, who had been playing wing, had to be replaced by Harris, as he had bowed attendant. At this period Taylor and Plank mixed things up a little and Leacock sent them both to the side with the option of a fine of $200.00 or thirty days. Cooch came up the side lines and scored with a long shot from across the rink, making the score 2—1, in favor of the Westinghouse.

Play had hardly commenced when Fraser scored with a long shot from centre, tieing the score. Just before the gong sounded, Allen scored again for the Westinghouse. This left the score at half time 3-2, in favor of the Westinghouse.

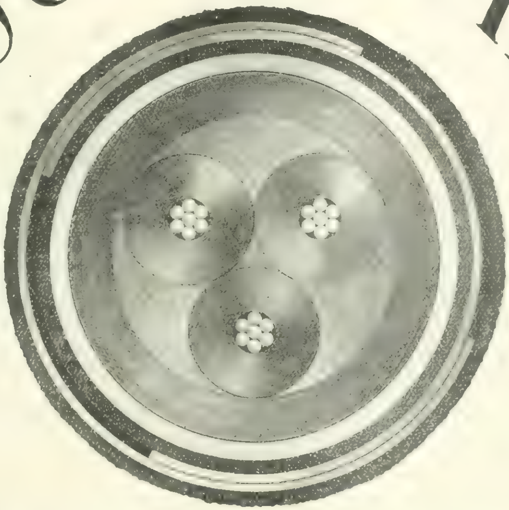
The third quarter opened up with both teams showing signs of distress, and just after play had commenced Wood scored a goal for the Rand Rocks, again tieing the score. This was the poorest quarter of the three. In fact it was only about ten cents.

In the final quarter, the players came on the ice, and, demonstrated their recuperative powers by putting out exceptionally fast hockey. It seemed as if the game would have to be decided as a tie, but just before the whistle had to be sounded, Allen scored with a pretty shot for the Westinghouse, making the score: Westinghouse 4, and Rand Rocks, 3.

Paul W. Koch & Company, 19 So. Wells St., Chicago, have been appointed the exclusive sales agents for the Universal bushings and flexible tubing clamps as formerly manufactured by the New Process Specialty Company of Milwaukee, Wis. This line in the future will be known as the "Jiffy" bushings and "Jiffy" clamps.

PHILLIPS'

ARMOURED CABLES



No. 2 B. & S. 3-Conductor 25,000 Volt Cable

Paper Insulated, Lead-covered, Double Steel Tape Armoured

Supplied to the Order of
The Quebec Railway, Light, Heat and Power Company

Eugene F. Phillips Electrical Works, Limited
MONTREAL

Branches: Toronto, Winnipeg, Regina, Calgary, Vancouver

Current News and Notes

Almonte, Ont.

The ratepayers of Almonte, Ont., passed a by-law authorizing the acquisition of the Wylie power plant at a cost of $25,000.

Belmont, Ont.

A deputation from the village of Belmont, Ont., recently waited on the Hydro-electric Power Commission of Ontario asking for a supply of power for lighting purposes. They are at present depending on natural gas, which is very unreliable

Carleton Place, Ont.

Wheeler & O'Hara, electricians, Carleton Place, Ont., have been succeeded by P. H. Skelley.

Collingwood, Ont.

Brett Brothers, of Collingwood, have recently gone into the business of electrical contracting, and purpose opening a store for the sale of electric fixtures and supplies.

Edmonton, Alta.

The G. N. W. Telegraph Company is erecting a new line from Edmonton to the Pacific Coast, via Kamloops and Vancouver. This line will be in operation by spring.

Guelph, Ont.

The receipts of the Guelph Radial Railway for the year ended December 31, 1919, show an increase of $16,000 over the previous year.

Kitchener, Ont.

Mr. W. O. Breithaupt, of the Kitchener-Bridgeport Electric Railway has announced his intention of applying for a charter to construct an electric railway from Kitchener to Guelph.

The annual report of the Kitchener Street Railway Department for the year 1919 shows receipts amounting to $81,203. The net profit is $4,048.

Lakefield, Ont.

The ratepayers of Lakefield, Ont., recently passed a Hydro enabling by-law. The local plant will be purchased and remodelled and meters are to be installed for all services.

Markham, Ont.

The extension of the Hydro transmission line from Agincourt to Markham is proceeding, and it is expected, will reach Markham during the month of February.

Montreal, Que.

Magicoal Electric Fires (Canada), Limited, have been incorporated. The capital stock is $50,000, and the chief place of business, Montreal.

Morden, Man.

A Government survey party is at work on the proposed hydro-electric transmission line from Oakville to Morden, Man. This line is expected to take in the towns of Carman, Roland, Rosebank, Miami, Morden, Winkler, and possibly two or three other points.

Port Perry, Ont.

The ratepayers of Port Perry, Ont., recently carried a Hydro enabling by-law.

Porcupine, Ont.

A newspaper report states that the Northern Canada Power Company, Limited, of Porcupine, are taking steps to increase their [illegible] from $[illegible],000,000 to $6,000,000. This company operates on the Mattagami River and supplies power to the mines in that district.

Regina, Sask.

The Packard Electric Company, St. Catharines, Ont., have been awarded a contract to supply three transformers for the Boggy Creek pumping station, Regina, Sask.

St. John, N. B.

A preliminary survey is being made in connection with a proposed $500,000 power plant to be erected on Green River, Madawaska County, a few miles above St. Leonards. Mr. Chas. Brandeis is consulting engineer.

Sandwich, Ont.

A court decision has just been rendered by Justice of the Peace J. White, at Sandwich, Ont., upholding the action of the Sandwich West Telephone Company in removing the telephone from the home of a subscriber who was found guilty of habitual "listening in" on a party line.

Teeswater, Ont.

A Hydro enabling by-law has been carried by the ratepayers of Teeswater, Ont.

Toronto, Ont.

The Bell Telephone Company have added another exchange to the Toronto system. This will be known as "Kenwood," and brings the number of exchanges in Toronto up to eleven. This compares with seven in Buffalo, thirteen in Cleveland, and fifeen in Detroit.

During five and a half years the Toronto Hydro-electric System have made grants amounting to $72,028 to enlisted employees.

The Toronto Board of Control have authorized the expenditure of $200,000 for new cars for the Toronto civic railway lines.

Windsor, Ont.

At a special meeting of the Ontario Hydro-electric Power Commission a few days ago, approval was given to the proposal to purchase the Sandwich, Windsor and Amherstburg Railway, a subsidiary of the Detroit United Railways.

Some New Electric Stores

Brett Brothers, of Collingwood, Ont., have recently gone into the electrical contracting business and purpose opening a store for the sale of electrical fixtures and supplies.

A new store has been opened at 449 Dovercourt Rd., Toronto, under the name, G. E. Gynn Electric. The firm carry a complete supply of electric sundries and appliances. They also do repairing and wiring.

Mr. J. E. Day, electrical contractor, has opened a store at 407 Spadina Ave., Toronto, where he will carry a complete line of supplies and fixtures.

Mr. J. B. Forsey, 159 Wychwood Ave., Toronto, has recently returned from three years' overseas service with the Canadian Expeditionary Forces and has started an electrical contracting business.

Mr. James Lamont, electrical contractor, fixtures and supplies, 880 Bloor St. West, opened an additional store at 810 St. Clair Avenue, West, on January 28.

[illegible] of the Hydro-Electric Power Commission of Ontario. More than [illegible] aluminium [illegible] these lines. The double [illegible] steel towers [illegible] by the Canadian Bridge Company.

CONTINUOUS SERVICE

Under the severest winter conditions are secured by the use of STEEL-CORED ALUMINIUM CABLES.

Let our Engineering Department figure out your transmission problems.

THE BRITISH ALUMINIUM CO., LIMITED
(of London, England)
263-267 ADELAIDE STREET WEST, TORONTO
Eastern Agents: Spielman Agencies, Read Bldg., Montreal

CANADIAN PORCELAIN CO.
LIMITED
HAMILTON - CANADA

Manufacturers of High and Low Tension Porcelain Insulators

Condensed Department

Publisher's Notice

Advertisements under "Situation Wanted or "Situation Vacant" are charged at two cents a word per insertion, minimum charge 50 cents.

Advertisements for tenders, equipment, wanted or for sale, etc., or miscellaneous, are charged at $2.80 per inch.

All advertisements must be in the publisher's hands by the 10th or 23rd of the month to insure insertion in the subsequent issue

SITUATIONS WANTED

HYDRO-ELECTRIC OPERATOR, married man; three years' experience Hydro-electric plant, nine years electrical experience, ready to start February 1st, 1920, good references. W. A. B., 74 Olive Ave., Toronto. 3

SITUATION AS OPERATING SUPERINTENDENT wanted by recently discharged officer. Twenty-eight years' experience in hydro-electric operation and supervision. A1 references. Box 91, Electrical News, Toronto. 3

SITUATIONS VACANT

WANTED—Sales Engineer. One familiar with transformers. Box 126, Electrical News, Toronto. 3

WANTED—Experienced Salesman for Electrical Apparatus. Good opportunity for right man. Apply Box 123, Electrical News, Toronto. 3

WANTED, ELECTRICAL DRAFTSMAN, familiar with 4000 volt, three phase, distribution systems, and underground street lighting system. Technically trained man preferred. State age, experience, and salary expected. Location, Essex County, Ontario. Apply Box 124, Electrical News, Toronto. 3-4

Electrical Engineer Wanted

Applications of higher mathematics to general engineering specializing in power transmission, distribution and communication problems. State qualifications and experience with above and with valuations. Apply Hydro-Electric Power Commission of Ontario, Employees Relations Dept., 190 University Avenue, Toronto. 3

Representation Wanted

Practical Engineer with Office in Edinburgh, graduate of Canadian University, with considerable experience in all branches of Central Station work in Canada and United States, invites correspondence with firms desiring representation in the British Isles, or desiring to make enquiries relative to prospective purchases. M. B. Macdonald, 123 George Street, Edinburgh, Scotland. 3-4

Electrical Business Wanted

by electrical engineer with $2,000 cash, as whole or part payment. Business to be situated in Eastern Canada and located where there is plenty of motor repair work to be handled. Write, giving full particulars, to Box 108, Electrical News, Toronto, Ont. 2-3

FOR SALE

One 100 K.V.A. 2200 volt, 3 phase, 60 cycle, 240 R.P.M. Westinghouse Generator, direct connected to Robb Armstrong 15" x 16" Engine No. 1203, complete with belt driven Exciter, Switchboard and Instruments. For particulars and price, etc., write A. G. Green, 311 [illegible] Ave., [illegible] 2-3

METHOD OF ASCERTAINING CORRECT BRUSH POSITION

Because correct brush position is of great importance in the operation of interpole machines, this is usually marked on the rocker ring by the manufacturer before shipment. On some older machines the brush position is not marked or is marked wrong, and it is usually advisable to determine it correctly. This is also important after armature rewinding. The "kick" method is thought best as it depends upon the transformer action between the field and armature conductors. To set the brush position by the "kick" method the armature cables and equalizer are disconnected and insulated. After the resistance in the field rheostat is "cut in" in series with the field the brushes are set at what is thought to be the correct position on the commutator bars, which are connected to the coils of the slots directly under the centers of the interpoles. A low-reading voltmeter (3-volt or 5-volt scale) is connected to one positive and one negative brush stud, and the main switch is closed and quickly opened again. If the voltmeter needle "kicks" one way when the switch is closed and the other way when it is opened, the brush position is wrong. The brushes should be adjusted until the position is found where the needle does not "kick."—Electrical World.

GOING OUT AFTER NEW BUSINESS

Some electrical dealers are of the opinion that their business is limited in appliance selling to the women who come into the store for an iron, toaster, or cleaner. This is not the case of a dealer in a Western city who lets the clerk take care of the store and spends most of his own time out hunting "big business."

The other day he was walking past a large wholesale coffee and tea house. He knew the concern would not be interested in purchasing a hundred percolators, but, anyway, could they use a ———?

"Is the sales manager in?" he inquired at the information desk.

"Yes, what is your business, please? Mr. Brown is very busy this morning," came the reply.

"Tell Mr. Brown I'm very much interested in that coffee and tea he is extensively advertising."

As it happened, Mr. Brown was gruff, the type "not interested in anything," and our dealer was not in the habit of arguing about things.

One Idea.—And Thirty Immersion Heaters Sold!

"Mr. Brown, just how many salesmen have you on the road now? Don't think for a moment that I am here to sell you life insurance, for I am interested in everything that will help build up this community."

"At present we have twenty-one salesmen covering three states, but just as soon as possible I want to put out ten more at least."

To make a long story short, Mr. Electrical Dealer convinced Brown that each salesman should carry an electrical immersion heater in order to demonstrate the excellent qualities of the tea. The immersion heater was small and consequently would not take up any extra space.

Brown ordered thirty heaters, each with 20 feet of extra cord, and when the transaction was completed the check was well worth looking at twice, for it represented "new business."

Another case of "new business" recently closed was that of heating a small church. It used to take all the Sunday collections to pay the janitor his overtime for getting up steam for the three hours of services each week, and all the coal used in that town was of the soft variety.

Mr. Dealer went to the trustees with figures showing that they could heat the church with electricity, with a saving of more than 50 per cent. each season, and that in two seasons the saving would be more than the cost of installation.

Under each pew was installed a small 600-watt radiant heater. The heat rays were thrown to the person occupying the pew just in back. Twenty heaters in all were installed, and will prove a dozen times more satisfactory than steam.

PETRIE'S LIST
of NEW and USED
MOTORS

No.	H.P.	Phase	Cycle	Volts	Speed	Maker
1	100	3	25	550	480	Westg.
1	75	3	25	550	750	Cr.-Wh.
1	60	3	25	550	750	Cr.-Wh.
2	52	3	25	550	720	Lancashire
2	50	3	25	550	720	Westg.
1	40	3	25	550	725	Harland
1	35	3	25	550	750	Cr.-Wh.
1	35	3	25	550	720	Westg.
1	30	3	25	550	1500	Tor. & Ham
1	25	2	60	220	945	Westg
1	20	3	25	550	750	B. G. E.
1	15	3	25	550	1450	Westg.
1	15	3	25	550	1400	Lancashire
1	15	3	25	550	750	Lincoln
1	10	3	60	220	1120	Westg.
1	7½	3	25	550	1500	Lang.-Dav.
1	7	3	25	550	725	Westg.
1	7	3	25	550	710	C. G. E.
3	4	3	25	550	1400	Excelsior
1	3	3	25	550	700	Westg.
1	1	3	60	550	1700	Westg
1	1/6	1	60	110	3400	Diehl.

Write Us for Prices

H. W. PETRIE, Limited
Front St. West - Toronto, Ont.

A. H. WINTER JOYNER, Ltd.
Engineering Specialties
TORONTO MONTREAL
Representing
Weston Electrical Instrument Company.
The Bristol Company.
G & W Electric Specialty Company.
General Devices & Fittings Company.
Pemco (Philadelphia Elec. & Mfg. Co.)

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 309 Broadway
CHICAGO - - - 1413 Gt. Northern Bldg.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879

Vol. 29 Toronto, February 15, 1920 No. 4

Discuss Engineering Status and Technical Education at Annual Meeting E.I.C.

The annual professional meeting of the Engineering Institute of Canada was held on January 27-29, in Montreal. The attendance was the largest on record, 413 members registering on the first day. The meetings were held in the Windsor Hotel. Colonel R. W. Leonard occupied the chair.

Reports from the different branches were submitted, with the exception of the Winnipeg branch. The Toronto Branch report was exceptionally good. Twenty meetings were held in Toronto during the year. Five of these were for the purpose of discussing that important question "Legislation for Engineers." Three new branches have been established in Ontario: the Niagara Peninsula Branch at Niagara Falls, the Border Cities Branch at Windsor, and the Peterborough Branch. The Kingston Branch has recently renewed its activities after temporary suspension during the war.

The subjects discussed included "Highways," "Technical Education" and "Quebec's Water Power Resources."

Quebec's Water Power Resources

Mr. O. Lefebvre, chief engineer of the Quebec Streams Commission." Mr. Lefebvre placed Quebec's rivers in two classes: those that are navigable and floatable, and those that are unnavigable and not floatable. By the term navigable he meant a stream that could be used for transportation purposes. The speaker gave an outline of the power development in the Province of Quebec. At first power development was considered an experiment and was backed by private individuals, but now the Provincial Government was either leasing power rights or selling them outright. During the last ten years a number of power rights had been leased, some of these for periods up to sixty-three years. In Mr. Lefebvre's opinion power development should be encouraged in order that more of Quebec's five million available horse power may be utilized. In his closing remarks, Mr. Lefebvre described the work of the Commission.

Technical Education

A discussion on technical education was introduced by Brigadier-General C. H. Mitchell, C.M.G., Dean of the Faculty of Applied Science and Engineering of the University of Toronto. The necessity of engineers employing their brains in Canada and for Canada, was, in his opinion, one of the greatest of to-day. General Mitchell stated that a university should not follow the policy of "wait and see," but should look ahead and be ready when the time comes, to say: "we have educated these men and they are ready for you." He spoke of the necessity of the student combining his course with the engineering industry, because a student's education lies out in the industries of life. In referring to the question of a fifth year being added to the engineering courses at the universities, Gen. Mitchell said that, in his opinion, the elementary work should be taught in the last year at school, instead of the first year at college, as it is at present.

Doctor F. Adams, of McGill University, spoke of the difficulties instructors of engineers had placed in their path. He said it was quite possible for the schools to carry on the first year work of the university. In a four-year course, he said, there were only two and a half years of actual study. He stated his opinion that within the next two years a fifth year will have to be added to the course.

Professor C. F. Scott, of Yale University, gave an outline of work carried on in the training of an engineer at Yale.

Luncheon at Northern Electric Company

A luncheon, as guests of the President and the Directors of the Northern Electric Company, Limited, was given to the members of the Institute immediately after the morning session on January 28. This was followed by an inspection of the works.

The following officers were elected for the ensuing year:

President—Mr. R. A. Ross.

Vice President—Brig. Gen. C. H. Mitchell, C.M.G.

Councillors—Messrs. F. B. Brown, J. C. Smith, A. R. Decary, F. A. Bowman, J. B. Challies, E. R. Gray, G. C. Dunn, B. S. McKenzie, G. W. Craig, J. R. C. Macredie and H. W. Burwell.

Annual Convention of Western Association of Electrical Inspectors

The 15th Annual Convention of Western Association of Electrical Inspectors was held in the Planters' Hotel, St. Louis, Mo., January 27th, 28th, and 29th, 1920. This convention was attended by members of the largest inspection departments in the western states and included the following inspectors from Canada; C. M. Tait, Canadian Fire Underwriters' Association, Montreal, The Electrical Inspector from Brandon, Man., and H. F. Strickland, Chief Electrical Inspector of the Hydro-Electric Power Commission of Ontario.

Many subjects were discussed pertaining to electrical inspection, the chief feature, however, of the convention being the recommendation to the Electrical Committee of the National Fire Protection Association of certain amendments to the National Code. The Hydro-Electric Power

E I C President-elect R A Ross

Brig.-Gen. C H. Mitchell, Vice-President

Commission of Ontario came in for considerable commendation for their advanced rules and regulations and one of the recommendations which will go to the New York meeting this spring will be that all knife switches be enclosed in externally operated cabinets. Although this rule has now been adopted by some of the individual states, it has not become a National Code requirement. At the Western Convention, however, it was unanimously recommended that such a regulation be made a rule of the National Electrical Code.

An address was given by Mr. H. F. Strickland covering the general conduct and operation of the Inspection Department throughout the Province of Ontario, which brought forth considerable discussion and many of the regulations which are in force in Ontario were highly commended and were of considerable interest to the association.

On Tuesday, the 27th, a luncheon was tendered to the members of the association by the Board of Trade of St. Louis. Mr. Victor H. Tousley, chief electrical inspector of the City of Chicago, being the speaker. Mr. Tousley most effectively explained the advantages of electrical inspection, and had no difficulty in convincing all those present that the work of the electrical inspector is not generally appreciated by the average member of the community. "Unlike the Fire Deartment," Mr. Tousley says: "there is no spectacular demonstration of the work. Upon the outbreak of a fire much noise and excitement is created by the appearance of the Fire Department, to whom all credit is due for the brave work accomplished by this excellent department, and the general public has the opportunity of witnessing the work which is actually accomplished, which, in many cases, prevents the destruction of the whole city. The electrical inspector, however, must carry on his work under cover and thus it is never actually known how many fires have been prevented and lives protected by the untiring efforts of the electrical inspection department. The electrical inspection department is also continuously confronted with the opposition of politicians, owners of buildings, and irresponsible contractors and wiremen; whereas, many other public service departments may proceed with their work unmolested.

The report of Mr. Goodwin's address at the Electrical Banquet held in Toronto on January 16th last, was referred to and the remarks of Mr. Goodwin were deplored. While many of the electrical fraternity understand Mr. Goodwin's remarks, it has, nevertheless, caused unfavorable and injurious comments to appear in newspapers not only in Canada but in the United States. and, inasmuch as the electrical inspection department has been one of the greatest protectors of the electric wiring business it is to be regretted that the good work of these departments should be so unfairly reported in the eyes of the public.

The meeting concluded on the evening of the 29th with a banquet held at the St. Louis Athletic Club.

Organization of Building Industry Aids All Other Industries

A few days ago the Canadian construction industry met in mass convention in Ottawa and prepared plans to take care of the flood of building and construction work which it is felt will inevitably develop with the approach of spring. It was pointed out that this industry was the second largest in the Dominion, being second only to agriculture, and that the continued progress of almost all other industries is concerned, this is most assuredly the case. The erection of new buildings—factories, offices and homes—means added demand for the products of the central stations, and the manufacturers, and added business activity for the whole salers and contractors and dealers. Indeed construction of any kind whatsoever—buildings, roadways, sewers, bridges—requiring, as it does, manufactured material of various sorts, must inevitably create a demand for electric current, electric machinery and equipment and electric brains, generally. in that these contributing products are, in the main, produced electrically. There is no part of our industrial life upon which the success of the electrical industry depends more than the continued activity of building and construction of every sort.

Montreal Poles, Wires, Cables, and Conduits in Hands of a Commission

The Montreal public utility companies put up a stiff fight in the Private Bills committee of the Quebec Legislature against the proposals of the city dealing with the erection of poles in streets and lanes and authorizing the city to impose a special realty tax on property situated in the streets, lanes and public places belonging to the public utility companies.

The city asked that the control of poles, overhead wires and cables, and underground conduits, should be placed in the hands of an independent commission, and that the work should be subject to the consent of the city.

Mr. DeGaspe Beaubien pointed out that there was not less than 100,000 poles carrying wires and cables, and on some streets there were not less than eight different lines. He contended that such a condition was very dangerous, besides being the source of a great waste of money. The joint use of poles as proposed by the city was not new, as it had been adopted by many American cities. It was contended on behalf of the companies that the two commissions in existence had power to deal with this question. After considerable discussion the clause was dropped.

During the discussion on the proposal to levy a special realty tax, it was stated that the city already had this right during the present year, and the object of the clause was to authorize its continuance indefinitely. The ground of opposition to this, was that it was unfair to penalize the companies, particularly in the case of the power companies, who were the pioneers of industry and prosperity in the province.

Mr. K. B. Thornton, for the Public Service Corporation, energetically opposed the clause, which, however, was passed, with the proviso that it should operate only during 1921 and 1922.

The Committee also passed a clause requiring the companies to deposit plans and specifications of all undergroud works, wires, cables, pipes, or rails. The companies opposed the clause, on the ground that it was impossible to supply plans of pipes already laid.

Mr. Goodwin's Sense of Humor

City of Winnipeg

Editor Electrical News, February 3, 1920

I much appreciate your timely comments in reference to Mr. Goodwin's remarks at the recent convention in your city in reference to the Electric Inspection Service. After making due allowance for the exuberance naturally incident to a banquet where 600 electrical men are met together, several of Mr. Goodwin's statements, in relation to this particular branch of our industry, should not be allowed to pass unchallenged.

When he states that women in the home are not able to change a fuse plug, he is probably entirely unaware of the fact that Canadian inspecting interests have already outdistanced his own people in this respect, and whatever safety and facility they have rendered possible in this respect is entirely due to their insistent efforts in this matter.

Again his reference to the delegation of inspection work in the United States to the Fire Underwriters is not correct —the Fire Underwriters assumed an obligation that municipalities should have shouldered [illegible] the [illegible] whole community is in their [illegible]. Now, however, many U. S. cities are not only taking full care of this duty but are successfully handling the life risk problem that the Underwriters are not concerned with. But neither New York or Chicago have yet sufficiently approached the golden age when they feel justified in omitting the inspections of the most important installations.

I am heartily in agreement with Mr. Goodwin as to the necessity for a "higher plane of ethics"—a doctrine that some people find easier to preach than to practice—and if Mr. Goodwin can raise the standard of installations in the minds of those who are, unfortunately, not "scrupulously honest," nor even indifferently efficient, and at the same time deter some manufacturers from placing fool-full devices on the market, he will find, I am sure, the inspecting interests will be delighted. Until that happy day the industry must, unfortunately, be "checked and re-checked."

Yours truly F. A. Cambridge,
City electrician.

In this connection it may be mentioned that in New York according to the latest available information,, all electric wiring is being inspected. The annual report of the electricity department states that for the year 1919 more than 90,000 applications for certificates of inspection were filed and more than 80,000 certificates issued.—Editor.

Prof. Kennelly Before Toronto Section A.I.E.E.

A lecture of unusual interest to electrical engineers took place at the regular meeting of the Toronto Section, the American Institute of Electrical Engineers, held at the Engineers' club, Friday, Jan. 30. Professor A. E. Kennelly D.Sc., of Howard University, delivered a lecture on Artificial Power and Transmission Lines. During the past thirty years of the electrical industry a marvellous advance had been made in electrical theory and transmission line formulae had been very thoroughly worked out. Much of this mathematical theory was of little use to the practicing engineer owing to its complexity and resource, has been had to more simple formulae derived for practical uses. Hyperbolic functions were of great use in the practical applications of electrical theory, and the speaker developed the mathematics of these functions at some length.

Of much use also to the engineer were the artificial lines built for laboratory investigation. By proper construction these could be made to duplicate real conditions and served to investigate transmission conditions on telegraph and telehone lines up to 500 miles in length. Professor Kennelly spoke at the Royal Canadian Institute meeting the following evening on the subject "Research in Engineering."

Mr. Peeling to Illinois Traction

Mr. C. U. Peeling, manager of the Stormont Electric Light & Power Company, Ltd., Cornwall, is resigning that position to accept office with the Illinois Tracton Company, an organization including some fifty-five elec ric light, power and city and suburban and traction plants in the Illinois district. He will leave Canada as soon as a successor can be secured to take his work. Mr. Peeling has had a wide experience in Canada, chiefly in connection with the Electric Power Companys operations, having held responsible positions in Sterling, Bowmanville and Oshawa before going to Cornwall.

Consumers Cordage Company, Ltd., who own an extensive cordage plant at Dartmouth have retained Smart & Burnett, Montreal, as consulting engineers for contemplated changes in their power layout.

Power from the Tidal Flow at Hopewell

Estimated Cost per h.p. of $122.50 for the First Hundred Thousand Horsepower — Ultimate Development of Twice that Amount

By Mr. W. Rupert Turnbull*

There have been numerous proposals for obtaining power from the tides at Sackville, at Cape Split, and at the Reversible Falls of Saint John.

Now to get continuous power at any of these sites, it would be necessary to form large artificial reservoirs, and the formation of such reservoirs is so costly that these proposals are not, at present, commercially feasible.

The three great desiderata for a tidal plant are: first, that there should be sufficient height of tide to obtain a good head; second, that there should be two natural reservoirs of large size so that continuous power can be obtained; and third, that the power plant should be central to the population that would be served.

And it is these three desiderata that lead us to suppose that the first great tidal development in the world will take place at Hopewell. Here we have two large reservoirs almost completely formed by nature; we have a tide which is exceedingly regular and that ranks among the highest tides in the world, with a spring rise of 45 feet, a neap rise of 38 feet, and a normal neap range of 32 feet, and we have this power centrally located to a present population of 250,000 who are literally starving for cheap electric power with no other hydro-electric developments in sight, except small ones and those that are too distant from the centres of population to make their development commercial at the present time.

I have examined many other sites for tidal power, in those parts of the world, where the tides are sufficiently high to make tidal power at all possible, and I am firmly convinced that we have at Hopewell, where the Petitcodiac and Memramcook rivers converge, the site that is most promising at the present time, from a commercial standpoint.

We will now discuss the principle which I have proposed for obtaining continuous power from these great tides, the two tidal estuaries, the Petitcodiac and the Memramcook rivers.

At present the flood tide makes up these rivers for approximately six hours and then turns and flows into the bay for 6½ hours, and this map shows the approximate limits of this flow, above which points the streams are fresh water.

Fig. 1 shows a scale chart of the confluence of these two rivers, at Hopewell, the proposed location of the dams that will be necessary to control the waters, the depths of water at low tide, etc.

The western dam would be 4900 feet long, the eastern dam 4800 feet long and a wing dam of 900 feet would connect the two. It would, of course, be part of the plan to have a highway and trolley line (operated by the plant) over the tops of these dams connecting up the two main shores and the long peninsula that makes down between the two rivers.

The proposal provides for making the Petitcodiac a high level basin in which the water would always be high, and be replenished at every high tide, while the Memramcook River would be a low level basin to be partially filled from the high level basin and be always emptied during the latter part of the ebb tide. This arrangement would also admirably suit local conditions for the Memramcook is exclusively a farming district in which much time and money is at present expended in excluding the tides by means of dykes, and I have been informed by farmers of this valley that they would only wish to have the salt water flood their lands, about once in ten years for the purpose of fertilizing them.

The same drawing, Fig. 1, indicates the principle I employ to get continuous power from the tides, with a varying head to be sure, but with the water always passing through the turbines in the same direction and always with a head sufficient to make operation successful. The diagram shows the confluence of the two rivers, with the necessary dams and gates to control the flow—the gates J, J, etc., in the western dam would be automatic flap-gates opening up-stream, allowing the high level basin (the Petitcodiac) to fill at every high tide and the gates H, H, etc., of the eastern dam would be automatic flap-gates opening down-stream, and allowing the low level basin (the Memramcook) to empty on every ebb tide.

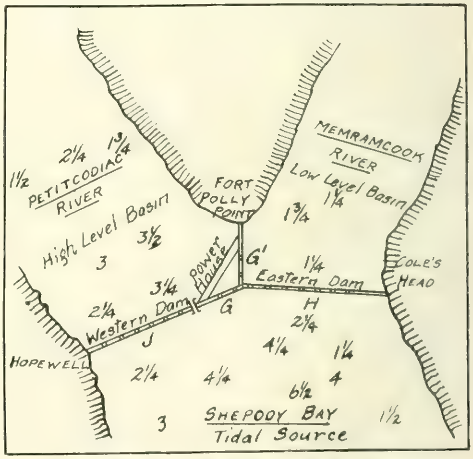


Fig 1—A chart showing the confluence of the two rivers at Hopewell, with the necessary dams and gates to control the flow

The gates G, G, etc., and G¹, G¹, etc., would be of the nature of lock-gates, they would be operated by electric motors, driven by the power-plant itself, and be under the control of the attendants who would open them and close them in accordance with the height of the external tide, at stated times that can be fixed for months in advance directly from the tide tables.

The power house is represented as a long building, with turbines, T, T, etc., extending diagonally from the Wing dam to the Western dam, and these turbines discharge continuously from the high level basin into the common, triangular, spillway. Let us now follow through a cycle of operations from low tide to the following low tide, remembering that the high level basin was filled automatically at the last high tide, and that the low level basin has just been emptied during the ebb tide through the gates in the eastern dam.

---

*[illegible]

Beginning with low tide we may at first leave gates G, G, etc., open and allow the water from the spillway to discharge directly into the tidal supply (Shepody Bay), but the head will gradually decrease as the tide rises, and at about 2½ hours rise the attendants close gates G, G, etc., and open G¹, G¹, etc., allowing the discharge from the spillway to enter the low level basin. The spillway will continue to discharge into this low level basin for about 6½ hours, or through the last 3½ hours of flood tide and through the first 3 hours of ebb tide, after which time the water in the low level basin will have risen, and the water of the tidal supply will have so dropped, that it will now be profitable to close gates G¹, G¹, etc., and open gates G, G, and once more allow the discharge to pass directly into the source of tidal supply and give the low level basin time to again drain out on the ebbing tide.

In dealing with the question of tidal power at Hopewell, we must remember that although the tide is regular in type, nevertheless the range of the tide, and not the rise, is the limiting factor of our power calculations, and it becomes necessary to establish and work on what might be called a "standard" range. For this purpose I have analyzed approximately, the ranges that will occur in the course of a year. I call spring tides those whose range exceeds 42 feet, they occur about 15 per cent. of the time, and I think no attempt should be made to utilize them especially; I call subnormal neap tides those whose range is less than 32 feet, they also occur about 15 per cent. of the time, and some means, which are discussed later, would need to be employed to avoid the impairment of our "standard" amount of power.

All other tides I call ordinary neap tides, with a range, at Hopewell, of 32 feet to 42 feet—they occur about 70 per cent. of the time, and it is the lower range of 32 feet which I think we should adopt as our "standard range and the curves and estimates that follow are based on this range of 32 feet.

We will now return to the discussion of the principles involved in the proposed plant. If the conditions at Hopewell were absolutely ideal, the ratio of effective areas would be as 2 to 1 for the high and low level reservoirs, but unfortunately this is not the case, for the Petitcodiac contains an effective area of about 330,000,000 sq. feet, while the Memramcook has only about 60,000,000 sq. feet, so that the ratio is about 5½ to 1. Thus, while the water in the Petitcodiac is dropping 6 inches per hour the water in the Memramcook is rising 5½ times this, or 33 inches per hour. Starting at low water, for 2.35 hours, the level of water in the low level basin is unchanged, for the water from the spillway is discharging into the tidal supply direct, but during this time the head is decreasing from 28½ feet to 13½ feet when it becomes expedient to discharge into the low level basin, when the head will at once rise to 27½ feet.

After this, for 6½ hours, the low level basin will rise, but the high level basin will also rise after 4.1 hours (as the flood tide will then be filling it for 1.9 hours) and we have the head decreasing from 27½ feet to 22 feet, but afterwards increasing to 23½ at 5.2 hours.

After this the head will gradually decrease to 13½ feet, at 9 hours, when the tide in the external bay having sufficiently ebbed, the water from the spillway will be again discharged into it and the head will steadily rise to its precious maximum of 28½ feet at low tide.

After this the head will gradually decrease to 13½ feet, at 9 hours, when the tide in the external bay having sufficiently ebbed, the water from the spillway will be again discharged into it and the head will steadily rise to its previous maximum of 28½ feet at low tide as shown by the curve of heads.

The average head, in this case, from low tide to low tide, works out at 22¼ feet.

We now turn to the question of costs and I have made an estimate of this as follows, and in accordance with the text books on the subject:—

Dam Cost in Cyclopean Concrete

Western Dam:	
730 lineal feet at equivalent height of 38 ft. and $137 per lineal foot	$ 97,000
4,100 lineal feet at equivalent height of 65 ft and $300 per lineal foot	1,230,000
Eastern Dam:	
2,800 lineal feet at equivalent height of 65 ft. and $300 per lineal foot	840,000
2,000 lineal feet at equivalent height of 35 ft. and $120 per lineal foot	240,000
Wing Dam:	
900 lineal feet at equivalent height of 30 ft and $94 per lineal foot	84,600
Total 10,530	Total cost $2,491,600

Now one well-known engineer, who examined my first report, considered this too low a figure and thought $4,000,000 should be allowed for dams, and since we will remain uncertain about the dam cost until borings are made it will be best to allow this higher figure in our preliminary estimates.

The other items of cost can be more accurately estimated from the known cost of equipment in existing hydro-electric developments and we have the following table of estimated cost.

Dams, as per preceding estimate	$4,000,000
Lock, in Western Dam	100,000
Sluices, gates, etc.	300,000
Power House of steel and concrete	200,000
Turbines, Generators, etc., at $40 per gross h.p.	3,600,000
Transmission Lines, etc.	1,200,000
Preliminary Dredging, Dam, Trench, etc.	100,000
Promotion, Engineering Fees, etc.	500,000
Auxiliary Plant to supply Head deficiency at Subnormal Neap Tides, say	1,000,000
Total cost of initial development to produce 99,000 gross h.p.	$11,000,000
Or cost per h.p. developed	$122.50

The cost for subsequent development is much less, relatively, for in the initial development full allowance has had to be made for the final development in all items except turbines, generators and transmission lines, and the cost of a full development of 200,000 gross h.p. would work out at about $16,000,000 or $80 per gross h.p. In this estimate for final development, the cost of shovelling and dredging the Memramcook farming lands (which would be necessary as previously shown) is not figured, for it would be undoubtedly good policy to start this work as soon as the power house was in operation and the necessary cost out of the annual income.

The Montreal and Southern Counties Railway Company have applied to the Railway Commissioners for an increase in the commutation fares between the South Shore and the city. An increase of 20 per cent. is asked for, which it is claimed, is required to meet increased labor charges and greater cost of material.

A Bonus Arrangement for Saving of Coal

There is nothing like having a direct financial interest in the excellence of his work to encourage a man to do his best, and with this frailty of human nature in mind, many station engineers have endeavored to devise schemes by which their staffs could receive some pecuniary reward proportional to the economy with which the plant is operated. There can be no doubt as to the benefits of such schemes when judiciously planned and honestly carried out, but a large number have failed in practice because one or both of these essentials has been lacking. The best of all bonus schemes are those in which every man stands or falls by his own efficiency, and receives an individual reward proportional to his own deserts. While, however, this can be arranged in many kinds of manufacturing, it is not practicable in a power plant. The underlying principle, nevertheless should be carried out as far as possible, because the alternative of a general bonus in which the whole of the employees share soon ceases to act as a spur to individual efficiency. What is everybody's business is soon considered as nobody's business and efforts towards efficiency languish.

The most fundamental division of the personnel of a power plant is into three shifts of men, and no bonus scheme will be really effective unless this division is recognized and each shift is rewarded according to its own performance, regardless of what others may receive. The natural emulation among the shifts must be encouraged by appraising the performance of each shift seperately, so that the good work of one is not neutralised by the bad performance of another. A further broad subdivision of the personnel is into engine-room and boiler-room staffs. It may not be worth while to recognize this division in preparing a bonus scheme for a very small station, but where the plant is of any size it is certainly preferable to make the distinction. Mechanics, electricians, boiler-cleaners, and other classes of workmen will be distributed between these two divisions according as their duties are more concerned with the engine-room or the boiler-room No workman should be left out of the scheme, even though his duties only indirectly effect the efficiency of the plant, otherwise jealousy and ill-feeling may be aroused, and these are to be avoided in a power station at all costs.

Supposing in the case of a particular station tt has been decided to introduce a bonus scheme, and the workmen on each shift have been grouped, as indicated above, into engine-room staff and boiler-room staff, the first problem is to decide upon some criterion of efficiency by which their performances may be judged. The men obviously should not be penalised by losing their bonus if a low-grade of coal raises the coal consumption per kw.h. or if a light load adversely affects the coal and water consumption per kw.h., as it must certainly do. We want, then, some standard of performance which enables their work to be fairly appraised independently of these disturbing factors.

It was shown in our last issue * that the standard coal and water consumptions, and the standard evaporative efficiency of any station may be obtained from the station records, and these three standards may be expressed in the form of simple equations. These equations at once furnish us with criteria of performance, and the merits of any shift can be determined, independently of the effect of the magnitude of the load, by comparing their performance with the standard. The justice of such a comparison cannot be impugned, for the standard is neither more nor less than the average of the performance over a certain period.

To show by an actual example how a practical bonus scheme can be inaugurated, we will consider a station of which the standard performances are given by the equations we have already considered, namely.

$$c = 12{,}000 + 2.325\ k \quad \ldots\ldots \quad (1)$$

$$w = 70{,}000 + 17.25\ k \quad \ldots\ldots \quad (2)$$

$$\text{and } c = .1348\ w + 2{,}565 \quad \ldots\ldots \quad (3)$$

It will be assumed that these equations were obtained when coal having a calorific value of 14,000 B.th.u. per lb. was being used.

Taking first the case of the boiler-room bonus, we will assume that this is to be computed and paid weekly, and that during a given week, shift A, for example, has worked 56 hours, and has burnt an aggregate of 314,400 lb. of coal (having a calorific value of 12,500 B.th.u.) in evaporating 2,180,500 lb. of water. It is required to compute their bonus. To render the formula (1), (2), and (3) applicable to a period of 56 hours, instead of to eight hours, the constant in each of them has to be multiplied by seven. The formulae then become

$$c = 84{,}000 + 2.325\ k \quad \ldots\ldots \quad (5)$$

$$w = 490{,}000 + 17.25\ k \quad \ldots\ldots \quad (6)$$

$$\text{and } c = .1348\ w + 17{,}955 \quad \ldots\ldots \quad (7)$$

Inserting our actual evaporation figure of 2,180,500 in place of w in equation (7) we get

$$c = .1348 \times 2{,}180{,}500 + 17{,}955$$

$$\text{or } c = 311{,}886$$

Thus for the evaporation effected, the standard amount of coal required is 311,886 lb. But this refers to coal of 14,000 B.th.u., and we have assumed the actual coal to carry only 12,500 B. th. u. per lb. Hence our actual consumption of 314,400 lb. must be corrected to compare with the standard by multiplying it by 12,500, and dividing by 14,000. The result gives us 280,714 as the equivalent of our actual consumption in terms of standard quality coal. Comparing this with the standard consumption of 311,886 lb. for the same evaporation, we see that a saving of 31,172 lb. has been effected, or practically 10 per cent. The bonus to be given to the firemen on that shift for their performance would therefore be an addition of 10 per cent. to their normal week's earnings.

Turning now to the consideration of the bonus for the engineers, this might be based upon the efficiency in the consumption either of steam or of coal per kw.h. of the net station output. Each plan has its advantages and its drawbacks, and the choice will usually depend upon the amount of control the engineers can exercise in the operation of the boilers. Where the firemen are virtually under the orders of the engine-room, the engineer's bonus will be based upon the coal consumption per kw.h., but if the engineers have no jurisdiction with regard to the boiler-room, it is fairer to base their bonus upon the efficiency with which they utilize the steam provided for them.

We will illustrate the application of the bonus scheme to the engineers on the understanding that they have no responsibility for the operation of the boilers. In such a case the criterion of their operation of the engine-room will be the standard steam consumption of the station, which we have already assumed to be represented, for a 56-hour period, by equation (6) above, namely,

$$w = 490{,}000 + 17.25\ k \quad \ldots\ldots \quad (6)$$

If during a week of 56 hours the aggregate output of this

---

* [illegible]

shift is 102,900 kw.h., and the aggregate steam consumption is 2,180,500 lb. of water, the engineers' bonus would be computed as follows: Inserting 102,900 in place of k in equation (6), and then obtaining the value of w, we find that 2,265,025 lb. is the standard quantity of steam for the output assumed. The difference between this figure and the actual steam consumption represents the saving effected by the engineers. This amounts to 84,525 lb. of steam, or about 3.73 per cent. of the standard consumption. Hence for the week in question the wages of the particular shift of the engine-room staff would be increased by 3.73 per cent.

Should it be desired to provide a bonus for any class of employees, based upon the overall efficiency of operation of the plant, the equation (5), namely,

$$c = 84{,}000 - 2{,}325\ k \ldots\ldots\ldots (5)$$

will be employed as a standard by which the performance of the station, over a 56-hour period, will be judged. If the men under consideration are not identified with any particular shift, then the entire performance during the whole week of 168 hours should be taken into account. The equation then becomes

$$c = 252{,}000 + 2{,}325\ k. \ldots\ldots\ldots (8)$$

and the actual performance of the station is to be compared with this, and the bonus computed in the manner already illustrated.

The working of the bonus scheme should have been made clear by the examples given, but it may be well to put the method briefly into words. In the first place, standards of (1) coal consumption and electrical output, (2) water consumption and electrical output, and (3) coal consumption and water evaporated are established from the records of the particular station. The method of determining these standards is explained in the previous article. The performance of the station in either of these respects, when operated by any particular group of men, is compared with the standard performance as shown by the appropriate equation. The wages of the men concerned are increased by the same percentage as the standard performance has been improved upon.

Several features of the scheme are worthy of attention. In the first place, while providing a useful and appreciated bonus for such savings as are reasonably likely to be made, the bonus does not become absurdly excessive if unexpected economies are brought about. A saving of 50 per cent. of the fuel would only increase the wages of the firemen to "time and a half," and "double time" is a limit which can never be reached. Hence there need be no hesitation in establishing a bonus on the plan advocated in any plant, no matter how long the existing standard of operation may be. Moreover, the management is quite safe in giving a pledge to the men that, once established, it shall never be modified or withdrawn without their concurrence. This is a very important consideration in inducing the men to endeavor whole-heartedly to improve the operating results.

Furthermore, the fact that the standards are no theoretical ideals of efficiency, impossible to obtain in practice, is an important point. Being based entirely on the average of actual performances, they are manifestly fair and easy to improve upon. By their very nature they inflict no hardship upon the shift which shows a high consumption per kw.h. simply because the output is small; for the standards are equally fair for all outputs. The disturbing factor of the varying quality of the coal supplied is also very simply and equitably neutralized.

To enable the workmen to understand the scheme and to know how their bonuses are computed, it is advisable to tabulate sets of figures, giving the standards of coal and water consumption per kw.h. for different outputs, and the coal required for different quantities of water evaporated. These tables can be calculated from equations (1), (2), and (3); or (5), (6), and (7), according to whether the bonus is calculated separately for every eight-hour shift, or over the week's performance. The figures may also be plotted as curves, and the latter together with the tables, hung up in some place accessible to the men concerned. An explanatory note should be added, pointing out that these standards merely represent ordinary performances of the station, and that wages will be increased by the same percentage as the standards are beaten by. If the coal burnt is of various kinds, the factor necessary to correct each kind to the standard calorific value should be given, so that the men have the whole of the data necessary to know what they are required to beat and to work out the amount of their own bonuses. It must be remembered that operating engineers and firemen are not professional mathematicians, and any little trouble required to make them understand thoroughly what is being done is labor very well spent.

It should be mentioned that there might be an irresistible temptation to some of the less scrupulous firemen to "help things along a bit" by excessive blowing down of boilers, so as to get fictitious evaporation figures. A little supervision will suffice to check this, especially if the engineers' bonus is based on the water consumption per kw.h., as such a trick would adversely affect their interests. Moreover, if, as is done in some stations, the evaporation figures are taken from the readings of integrating steam meters attached to the boilers, there will be no inducement to blow the boilers down unnecessarily.

Electric Safeguards for the Safe and Expeditious Movement of Steam Trains

To the ordinary city dweller the many ways in which electricity serves to supply comforts, pleasures, and needs of daily life are seldom realized. When it is considered that it is not so many years ago that what is now accomplished by electricity was not within the imagination of man, one dare not challenge the statement that has been made, that it is yet within man's power to harness for his use even greater forces than has as yet been done.

Perhaps the least known of the uses of electricity is that applied for the safe and expeditious movement of steam railway trains. The ordinary passenger makes a journey by a steam railway train, and further than knowing that the power used to move the train is steam, dismisses the consideration from his mind. Whereas, from the simple automatic announcing of the approach of a train to the station by the ringing of a bell, or the moving of an indicator when the train may be a mile or more away, to the elaborate electric interlocking plant as installed at the C. P. R. Windsor Station, Montreal, not only is the approach of a train announced, but the signal indicates to the engineer that the route is clear. The switches themselves are operated and automatically locked, also the passage of the train through the route, which may be over several switches, is indicated in the interlocking station.

The railway companies have gone to great expense in the installation of automatic electric block signals which provide an indication to the engineer that the track is safe for the train to proceed. These signals are automatically set at "stop" by the train, because the wheels and axles bridge the space between the track rails, and so make a short path for the electric current which flows along the rails. As long as the train remains within the length of the track governing the signal, a train following cannot enter onto the same portion of track without the signal indicating that the section is already occupied.

There are various types of electric signals. The type generally used is known as the semaphore, consisting of a movable arm which gives the indication by day and [illegible] ed light which serves as the indication by night. The colors used are red for "stop," yellow for caution," and green for "proceed." The positions of the arm are horizontal, forty-five degrees above and ninety degrees above the horizontal, respectively. The arm of an automatic signal is moved from the horizontal position by an electric motor, and the colored glasses attached to the arm move in front of a lamp, giving the color indication corresponding to the position of the arm. The electric current operating the signal, and also all the circuits used for its control, may be either direct or alternating. If direct current is used, it is usual to supply this from a primary battery, which is located close to the signal, and is protected from the weather by a shelter which is sunk into the ground, keeping the battery at a more even temperature.

Automatic signals are used both on double and single track. On a double track signals govern a train in the direction in which it moves on each track, the direction for each track being called "Current of Traffic." These signals are used chiefly to provide a space between trains moving in the same direction on the same track. On a single track one set of signals governs trains going in one direction, and another set governs trains going in the other direction. Therefore on a single track it is necessary not only that signals provide a space between following trains, but they must also provide a space between opposing trains, and with the modern signalling for single tracks, when a train moves away from a station, it automatically sets at "stop" all the signals in the opposite direction between it and the next station.

The automatic signal not only gives safety in train operation, but also greatly increases the number of trains that can be safely run an the same track. Some tracks on which traffic is extremely heavy, require signals spaced, at the utmost, one mile apart.

In railway operation electricity is used for many other purposes, such as, electrically controlled train staff machines from which a train staff may be extracted to be issued to a train as authority to move between two stations. When the staff is conveyed by the train to the next station, and deposited in the staff machine located there, another staff may be issued at either station, giving authority to another train to run over the same portion of track. The staff machines are so constructed as to make it impossible to extract more than one staff from either one of each pair of machines. There is also what is known as remote control of a switch by which a man can prevent the opening of a switch.

The automatic electric alarm bell at highway crossings which is operated by the approaching train not only gives audible warning by ringing a gong, but also visual warning by the lighting up of a danger sign. This device, so familiar to travellers on the public highway, is another electrical device which performs an important function.

It is the purpose of this article to mention only the more modern uses of electricity, but one must not forget the telegraph system and telephone which perform an important part in railway operations as they do in commercial and private life.

Presentation to Mr. Acton Burrows

As a token of respect and an appreciation of long and valuable service, the members of the Canadian Electric Railway Association recently presented Mr. Acton Burrows, Toronto, with a handsome Sheffield server of antique design. For some fifteen years Mr. Burrows has been honorary and acting secretary of this association, but pressure of other business has now forced him to resign this position.

Large Electric Company Makes Notable Transfer of Engineers

Seventy-five engineers from the machine works of the Westinghouse Electric & Manufacturing Company of East Pittsburgh, Pa., and their families, were moved on Jan. 14th to Lester within 10 minutes' walk of the South Philadelphia works of the Westinghouse company, where the Machine Works Engineering Department has been transferred. Contrary to the old system of every man's looking out for a home to which to take his family, the company had built a large number of houses which are rented to employees. Photographs were taken of the houses and sent to East Pittsburgh, along with blue-prints showing their construction and location. The engineers families were permitted to select from the drawings and photographs, their choice of a home. Each engineer was given a blue-print of the house in which he was to live, showing the size of rooms. He then made out a tag designating where each piece of furniture should be placed. The packing, crating and shipping of the furniture was accomplished without any physical exertion on the part of anyone of the families, for the Westinghouse company engaged five of the leading transfer and storage companies of Pittsburgh to go into their homes, pack, crate, and deliver the furniture to cars. The work was done in a record-breaking time. It required only eight days to complete the packing of the household effects of the 75 families.

When the furniture arrived in Philadelphia, it was unloaded and hauled in trucks to the new homes and unpacked. Carpets were laid and the goods placed in rooms, in accordance with the requests of the family. It required 40 cars to complete the shipment of furniture and automobiles. In the meantime, the employees continued their work at the East Pittsburgh plant, living with friends and in hotels. The engineers and their families left for Philadelphia on Wednesday evening, January 14, on a special train consisting of nine pullmans. They arrived in Philadelphia at 7.10 Thursday morning. They were given their breakfast at the Broad Street Station, Philadelphia, after which special street cars carried them to the South Philadelphia works for an inspection of the plant. They then went to their new homes.

New Book

Electric Lighting, by O. J. Ferguson, B.S., Professor of Electrical Engineering, University of Nebraska. McGraw-Hill, Inc., New York, publishers; price $2.50. There are excellent books on the market which satisfactorily cover certain parts of the field which is understood to be included by the term "Electric Lighting." Generally speaking, however, they emphasize some one or more phases of the subject to the partial exclusion of all other equally important phases. This limits their usefulness as text books and it has been the aim of the author to meet the need in this particular respect by the production of a well balanced presentation of fundamentals, with principles and practice combined throughout the whole book. The scope of the work may be judged from the following chapter headings: conductors; wiring; circuits; apparatus; incandescent lamps; the arc; gas tube lamps; illuminating calculations; residence lighting; general offices; store lighting; factory lighting; auditoriums; schools; art galleries; streets; flood lighting yards, buildings, etc.; color; rates. Size, 6 x 9. Standard cloth binding.

The Ontario Safety League has announced a change of address. On and after Feb. 1 all offices will be located at 189 Church St., Toronto, telephone M. 1050.

Description and Characteristics of Lead Cells

An Elementary But Most Interesting Paper Read Before the Montreal Electric Luncheon by Mr. H. S. Brown, Canadian Hart Accumulator Co.

A lead battery cell is made up of two plates or sets of plates (the positive and negative) immersed in electrolyte consisting of dilute sulphuric acid. The negative plate is sponge lead (p6) and the positive peroxide of lead (p60²), these forming the active couple; commonly called the element. When in good condition these plates are readily distinguishable by their colour. Positive plates are of a rich brown or chocolate colour and the negatives are a light gray.

The plates are usually flat and thin, there being several positives and negatives in each cell. All positives are connected in parallel in one group to a common terminal or bus-bar and the negatives are connected in another similiar group, the two sets of plates being interleaved with each other, so that each positive plate has adjacent to and facing it on either side, a negative plate. Usually the plates are set vertically in glass, rubber or celluloid jars or lead lined tanks according to class of service or capacity.

Adjacent plates being of opposite polarity, they must be kept separated and insulated from each other, as electrical contact between the two will short circuit the entire cell. To prevent such short circuits, separators are placed between the plates. Circulation of the electrolyte from plate to plate or its contact with the plates must not be prevented by these separators, which are usually made of porous wood, perforated hard rubber sheets or glass rods.

The cell is said to be charged when the electrodes are in a condition to give out current. Giving out current is called discharge, and when an amount of electrical energy has been taken from the cell which lowers the voltage to approximately 1.8 volts it is said to be discharged. Passing current into the cell from an outside source in a direction opposite to the discharge flow and thereby reducing the exhausted chemicals back to their original useful condition, is called charge. The term charge does not therefore mean that any electricity is stored in the cell or remains in the plates, but means that the chemical conditions of the elements is such that they form an votaic cell similar to an ordinary primary cell.

A charged cell, is one in which the active material of the positive plates is lead peroxide, and that of the negative is sponge lead, while a discharged cell is one in which a portion of the active material of both positive and negative plates have been converted into lead sulphate.

Electric current flowing through the cell in the direction of charge has the function of a chemical reducing agent only, and when passing in the discharge direction the current given out is produced by the energy of chemical combination, in other words, electricity is not actually stored, but chemical energy is produced on charge which reverts the electrical energy on discharge.

As previously stated, discharge of a cell is attended by the formation of lead sulphate. Lead sulphate is white in color, has a high resistance, being in fact an insulator, and its volume is greater than that of the lead or lead peroxide, of which it is formed. On this account a cell should never be discharged below the limit of approximately 1.8 volts because the excessive quantity of sulphate formed will injure the plates electrically on account of the resistance of the film of sulphate and mechanically tending to expand and loosen the active material. The plates of the cells that have been over-discharged, and [illegible] [illegible] [illegible] are said to be sulphated. A deposit of white sulphate on the surface of the plate indicates this condition.

The ampere-hour is the unit of cell capacity, and is the equivalent of an ampere flowing for one hour, therefore the rate of flow in amperes, multipled by the number of hours the current rate is maintained, is the capacity of any cell on discharge.

A lead cell has a voltage of approximately two volts. When used for higher working voltage a sufficient number of cells is conected in series to give the required pressure. For a 100-volt circuit approximately fifty cells are necessary, while for five hundred volts approximately two hundred and fifty cells must be connected in series, each cell of the desired ampere hour capacity necessary for the service.

The lead storage battery in common with every other electrical device, has certain efficiency which is the ratio of energy given out by the cell to the energy required to recharge it. This efficiency varies with so many factors that time will not permit of my dealing with them. Suffice it to say that a fair commercial range for watt-hour efficiency if from 80 to 92 per cent., depending on the class of service for which the cell is designed and used.

Every cell has an internal variable resistance which causes a drop in the voltage when discharging and an increase when charging. Voltage rises gradually as charge proceeds, until a maximum of approximately 2.6 volts per cell is reached. On discharge, the voltage sinks gradually until the minimum is attained approximately 1.8 volts.

As neither sponge lead nor lead peroxide possesses strength rigidity or high conductivity a lead battery plate is made of two parts, i.e.; the grid, which is a rigid framework and the active materials. Solidity and strength are given the plate by the grid, which also acts as a conducting path to carry current and distribute the electrical and chemical action evenly over the surface of the elements.

An ideal grid should be so constructed that it can expand or contract as the volume of active material changes on charge or discharge. As such construction is impossible, the inability of designers to meet the requirement causes most of the troubles in storage batteries. Expansion on formation is very great, while expansion and contraction of the positive active material on discharge and charge are considerable. The positive plate is most affected by this condition as working of the lead of the grid is continuously though slowly, oxidizing it, which means a continuous expansion or growing of this electrode. The negative is not so affected, as its active material is so soft and spongy that the natural changes in volume on charge and discharge are easily absorbed in the lead sponge itself.

As previously stated the chemical action of a battery on discharge is to transform both the sponge lead of the negative plate and the lead peroxide of the positive plate to lead sulphate and the reverse on charge. Numerous theories concerning the change from one condition to the other have been advanced from time to time, which are widely at variance, and the fact is, the chemistry of the storage is not perfectly understood.

If the discharge [illegible] [illegible] [illegible] [illegible] below 1.8 volts at normal discharge or slightly lower at a high rate of discharge, and the discharged plates be allowed to stand in the electrolyte, an excessive amount of sulphate is formed. This condition is indicated by a reduced capacity of the cell, increase of its internal resistance and visibly by a white deposit on the plates.

Electrolyte

Electrolyte must be of sulphuric acid made from sulphur diluted with sufficient pure, distilled water to bring it to the required density. Never buy acid from a chemist, or, in fact, from anyone who does not understand the special quality required for storage battery use. It is equally important to take similar care with distilled water. In mixing electrolyte the acid in every instance should be poured into the water, and never the water into the acid. The reason for this is that in pouring water into the acid a chemical combination is formed and not a mere mechanical mixture, and heat being liberated, the liquid becomes hot.

Most battery manufacturers supply electrolyte of proper concentration and it will usually be found advantageous to buy this rather than go to the trouble and taking the risk of mixing in small quantities at the point of using.

If mixing is done use only glass, earthenware or lead vessels, and the liquid should be stirred with a clean wooden stick the acid being added to the water slowly. Mixture must be allowed to cool before pouring into the cells..

The specific gravity will be found greater after cooling and the careful addition of a little water may be necessary to bring the liquid to a proper density.

The specific gravity of electrolyte when cells are fully charged averages about 1.210 at 60° F. for station type batteries, though in motor car batteries densities of from 1.270 to 1.300 are generally used. On discharge, the abstraction of the SO_4 from the electrolyte which combines with the lead oxide to form lead sulphate, causes the specific gravity to gradually fall.

A cell should not be discharged below a density of 1.150 for station types, and 1.170 to 1.195 for motor car types as a usual practice. Freedom from impurities is most important in electrolyte.

Excessive heating in a cell indicates either a high interval resistance due to the sulphate or impurities in the electrolyte. All impurities, however, do not cause a noticeable rise in temperature

1.80 volts has been adopted as the stopping point of discharge when the battery is discharging at the eight hour rate and slightly lower when supplying current at the one-hour rate. Below this voltage a cell will give but few ampere-hours, and at a low voltage, so that the additional watt-hour capacity is almost negligible, while the excessive discharge causes abnormal expansion of the active material resulting in shedding, distortion of the plates, and in extreme cases, the cracking of the grids.

Internal Discharge

Internal discharge, or local action, is loss of energy in the cell. Its cause is local currents in either of the plates bowing from one point to another, due to a difference of potential in different parts of the same plate. Two kinds of local action occur. One is normal internal discharges occurring in a cell which is free from impurities in either electrolyte or plates. The other is an abnormal discharge caused by impurities in the cell. Normal internal discharge takes place only at the end of charge. It is of short duration and seldom of practical importance. Local action is generally taken to mean the continuous internal self-discharge which results in reduction of capacity and the sulphation of the plates.

Excessive local action can nearly always be traced to impurities in electrolyte, although it is occasionally found to be caused by impurities in the active material and Some impurities will attack only the negative plates, while certain others attack both positive and negative plates.

On account of its porosity when fully charged the negative plate, if exposed to air, oxidizes so rapidly as to become hot, and is thereby hardened. It can only be again reduced to a useful condition by a long, developing charge. such as was required for its original formation.

Separators

Wood, hard rubber, glass and celluloid are the material generally used for separating adjacent plates. Wood and hard rubber are commonly used on smaller sizes of cells, particularly those intended for portable work, although wood is quite frequently used in the large stationary cells as well. Wood is generally satisfactory and efficient and gives excellent results if given careful treatment in preparation to remove impurities and render it porous.

Wooden separators are simply wooden diaphragms and are usually provided with light ribs which are intended to form vertical channels for the circulation of electrolyte. The thickness is usually from 3/32 to 3/16 inches. The height of the ribs and the depth of the channels between them is about half the total thickness of the separator.

Under the action of acid, it is true that the wood loses some of its strength, but with the support of the plates on either side, wood separators if not disturbed, will serve their purpose for years. Replacements are, of course, necessary any time the plates are moved.

Wood separators have the advantage of giving a positive separation between adjacent plates and effectually prevent contact between the opposite plate surfaces and short circuits from this cause. No perforations are necessary in these separators as the electrolytic action takes place through the pores of the wood.

Hard rubber is commonly used as separators particularly in the smaller sizes of cells. Such separators are generally made of thin sheets perforated and strengthened at intervals by ribs. Although hard rubber maintains its strength under the action of acid better than wood it has the disadvantage that there is a possibility of particles of active material passing through the holes and short circuiting the cell.

This is particularly liable to happen in portable cells, where the plates are very close together. In such cells the hard rubber separators may embed themselves into the soft sponge lead of the negative plate due to vibration and the active material press through the perforations sufficiently to make contact with the adjacent positive plate.

Celluloid separators are used extensively in Europe, but are not used by any manufacturer on this continent on account of their inflammability.

Glass separators are principally used in large cells and only in stationary batteries. These are simply a series of glass rods or tubes. These rods are placed between the plates, extending vertically from above the top to below the bottom of the plates. From three to five rods are usually placed between adjacent plates depending on the size of cell.

Durabilty and Cause of Deterioration

The active material best suited to give long life is hard and tough, yet porous and of light weight. It should cling tenaciously one particle to the other, and also to the base or grid supporting it, and the whole plate should be a strong compact mass. Positive plates should be hard, resisting being cut into by the thumb nail. Such active materials can expand and contract without excessive shedding or dropping particles from the surface.

Positive plate life is limited chiefly by the shedding of the lead peroxide, which loss of active material is inseparable from the working of storage cells.

Volume of active material on discharge increases con-

(Concluded on page 49)

Electrical Quebec Suspends Operations for 2 Days to Study "Co-operation"

All the different sections of the electrical industry in the Province of Quebec will get together in the Windsor Hotel, in Montreal, on Wednesday and Thursday next, February 18-19.

The province of Quebec has almost unlimited power resources; it is already available in tremendous total in the form of electric energy.

Further ample supplies only await the demand.

The Montreal convention is being held for the express purpose of discussing ways and means of organizing a closer co-operation between central stations, electrical manufacturers, wholesalers, contractors and dealers, to the end that this demand may be created as expeditiously as possible and, having been created, may be supplied in the most economical and efficient manner.

The value of electricity in the factory, the office and the home, is no longer a matter of discussion among electrical men. It is an established, recognized fact. It now only remains to convince the general public. Fortunately for us they are in an inquiring, receptive mood. They are asking for help.

Shall Quebec not organize and give its people this great boon—electricity? The province has it, in great quantities, to dispose of. The citizens need it and—**almost**—want it. Organization of the industry can quickly effect a balanced condition.

The Quebec movement is in the hands of an organization that has taken for its name "The Electrical Development Association of the Province of Quebec." Every electrical man in the province is eligible for membership. Every member is expected to work and boost for his association. The program for the two days, as tentatively arranged, is the following:

Wednesday, February 18

12.30 p.m.—Electrical Club Luncheon—Mr. W. L. Goodwin, speaker.
2.30 p.m.—Meeting of Electrical Contractors and Dealers, to be addressed by Mr. W. L. Goodwin and Mr. S. A. Chace.
8.00 p.m.—Informal Smoker and Entertainment.

Thursday, February 19

3.00 p.m.—Meeting of Manufacturers and Jobbers.
6.30 p.m.—Informal dinner at which Mr. W. L. Goodwin, Mr. S. A. Chace and other prominent electrical men will speak.

Quebec Electrical Men—Here is your opportunity! You, as individuals, have a certain duty to perform! See to it that—whatever others may do—you do not fail in that duty.

The Contractor-Dealer

The Field of Electric Lighting is Unlimited—Proper Illumination Exerts a Big Physical Influence—Some Brief Suggestions for Layout in Various Rooms

Electric lighting possesses qualities presented by no other means of lighting. It is extremely flexible. Baseboard and floor outlets permit one to place a light anywhere in the room.

It is thoroughly safe and adaptable to any kind of a shade; silk, parchment, paper, glass, or metal. An endless variety of combinations of material can be called into play. Electric bulbs are so convenient that they can be placed anywhere; behind a cornice, in a vase, or wherever fancy dictates.

Electric lamps are standard in a wide range of sizes, from the little 10-watt, giving just a very small amount of light, to huge bulbs which are limited in power only by the commercial demand. Thus, the light for a room does not have to originate from one spot. It can be distributed so that there are just a few touches of light here and there where desired.

Another valuable feature has been mentioned above. This is the wide variety of color tones which can be obtained either with colored lamps or through the use of painted gelatines or fabrics. There is no excuse for illuminating the residence throughout with the raw or unmodified light. One would not think of leaving all the walls, for example, in their original plaster finish.

With the possible variety in lighting, it is really a shame that such a high percentage of our homes are lighted in a most commonplace manner. One is prone to accept whatever form of lighting happens to be found in a house when purchased or rented; whereas, if the wall coverings were ugly, they would not remain long in service. Lighting is certainly much more important.

In view of the widely different tastes, it is almost impossible to completely cover the subject of residence lighting. The only practical method of treatment is to discuss in more or less detail the requirements of each room, having in mind the following elements: arrangement of outlets, type of fixtures ordinarily used, their advantages and disadvantages, where unsatisfactory, how they can be modified to be most suitable, style of glassware or reflector, type and size of lamp, and finally the possibilities in connection with each room.

Porch

In taking up rooms of a house in their logical order, the porch is naturally the first to receive our attention. As the porch is the part of the home which is most readily visible from the street, a well illuminated porch is an indication that the owner is doing his share in one respect at least towards the general attractiveness of the town. Proper lighting here in addition has an element of protection, for burglars and sneak thieves are more likely to pass by a house that has a porch light burning than one that has not.

Some porches merely serve as an entrance and require a low intensity of general illumination which spreads over the steps to avoid danger of accident. The wattage or size of lamp used here should be very small for it is desirable to have this light burning all the evening.

The unit most commonly employed for this service is a close fitting ceiling ring with a diffusing enclosing globe. Its advantages are that it is inexpensive and neat. A somewhat decorative type globe of opalescent or white glass is preferable to the round roughed glass ball ordinarily employed for it gives better diffusion. The porch light should not be permitted to accumulate a season's supply of dust and dead insects so often in evidence.

One of the greatest inconveniences, when calling at night in an unfamilar locality, is to locate the desired number. A house number porch light is therefore a great source of satisfaction to both the owner and his friends. A number of types on the market show the numbers luminous against a dark back ground, at the same time transmitting light, through a portion of the fixture, which serves to illuminate the porch itself. Civic pride as well as personal convenience demands the installation of more illuminated house numbers.

In the better class of home, the porch is usually fitted as a room and used for playing cards or reading at night, and in such cases they should be lighted in the same manner as a room, and here an opportunity is presented for harmony of lighting. The use of cretonne shaded portable lamps which blend with the furniture decorations is excellent practise. Weather proof flush receptacles at convenient points offer means of attaching such units.

The idea of outdoors can often be carried out on the porch and the sun-parlor or solarium presents opportunities for originality in lighting. Totally indirect fixtures are available provided the ceiling is of the proper light tone, and artificial vines hanging over the edge of the indirect unit give it an appearance of simply another group of foliage. Simple forms of direct lighting angle reflectors can often be used inverted as indirect wall bracket units.

Hall

We pass from the porch to the front hall and this room so varied in character from the mere vestibule to the luxurious reception room that it is difficult to make any general treatment. If it serves merely as an entrance, a single low wattage lamp enclosed in a diffusing glass globe is quite appropriate. Either the lantern type or fixture resembling a hanging urn is suitable. Three-way switches controlling this light are of considerable service. One should be located near the entrance door and the other at the head of the stair or in the upper hall.

Where the room serves for purposes similar to a living room, the methods of lighting described in connection with this are applicable. An additional outlet, however, in such cases is desirable. This consists of a bracket fixture with a low wattage lamp and diffusing shade at one side of the stairway. The 10-watt lamp for example is so economical that it may be burned all night forming an extremely effective burglar insurance as well as a convenience.

Living Room

The next part of the house to receive our consideration may be known as the living room, parlor, library, or den, depending on local conditions. Here is the part of the home where probably the greatest opportunity is presented for artistic effects and originality. The widely diversified uses of this room give rise to different lighting requirements, and provision should be made for meeting these. When the family is gathered or when merely only a few friends drop in for a social evening, the maximum degree of comfort is attained by having a comparatively low value of general illumination supplemented by points of rather higher intensity. Every precaution must, of course, be taken to insure thorough diffusion of the light and elimination of brilliant light sources. When the room is used for a larger gathering, such as a card party or dance, it is desirable to have a relatively high intensity of evenly distributed general illumination. When the room is used by only one or two people, it is often preferable to have practically no general lighting and merely a certain area illuminated.

One of the simplest methods of meeting the above requirements is by the installation of a central unit of either the indirect or semi-indirect type so wired that two degrees (low and high) of illumination are produced.

The indirect units should be hung at such a height that the cut off, or edge of the circle of bright illumination, comes at the junction of the ceiling and walls or at the picture moulding. Often when gas-filled lamps are used their rather concentrated filament causes sharp shadows of the supporting chains or hanger. In such instances, it is well to use lamps all frosted or where 50-watts per socket is adequate, the latest development in incandescent lamps, the white Mazda lamp, is especially well suited.

This general illumination should be supplemented by local or portable lamps served from base board outlets at various points about the room. These portable lamps may be in the form of the standard reading lamps, small art glass decorative lamps, and the like. Color modification may be introduced by using superficially colored lamps in the main lighting unit or with properly selected gelatine screens.

The art glass and silk shaded lamps offer other opportunities for the introduction of a touch of color. Numerous pleasing effects can be produced by inserting small lamps in translucent vases, or ornaments. The writers recently noticed a touch of originality where a vase of flowers was located in a rather dark part of the room. A low wattage lamp in an inconspicuous reflector directed a beam of light on these flowers, rendering them luminous by reflection. Such effects as these are most interesting and appealing.

Instead of the central or ceiling unit, the general illumination is often supplied by wall brackets with suitably toned diffusing glass shades, silk shades or scones, the design of the bracket of course being in harmony with the decorative period of the room. These also should be supplemented by the portable or table units. If gas-filled lamps are employed in open top silk shaded portable lamps, a circle of very bright illumination as well as shadows of the support is cast on the ceiling. To prevent this affect, the top should be covered with thin silk, or other fabric, or diffusing bulb lamps installed.

The portable, table or floor, silk shaded indirect and direct lighting unit offers another solution of the problem of supplying general as well as local lighting. The most commonly used form employs an inverted mirrored reflector with a relatively large lamp pointing upward with a group of frosted smaller lamps for supplying the direct light. The general lighting may be toned by placing a sheet of colored gelatine across the mouth of the indirect reflector. The operation of a pull chain switch enables either the general illumination or the local lighting to be available at will. A similar effect can be produced by using a prismatic or dense opal bowl shaped reflector inverted within a silk or parchment shade.

Where a central unit takes the form of direct lighting, the silk shaded multi-arm candle stick fixtures harmonizing with the wall brackets is often employed with splendid results. In the Colonial type of interior, the Georgian style chandelier with etched crystal shades and lamps burning upright is perfectly good taste, but not as thoroughly comfortable on account of the relatively high brilliancy of the units as some of the other schemes which have been discussed.

The necessity for a generous number of base-board and floor receptacles cannot be too strongly emphasized as these make possible the display of individuality so much to be desired.

Dining Room

The scheme of lighting best suited for the dining room depends on a number of factors: the size of the family, for example, having an influence on the type of equipment installed; the personal preference of the hostess is also important. The scheme which has always appealed to the writers as being most satisfactory is to have a high intensity of illumination on the table top and the rest of the room in comparative shadow, not darkness. Such lighting as this concentrates the attention to the family group and provides a closer spirit.

Illumination of this character is produced by the "old-fashioned" dome. Where there is a large family, however, or likelihood of considerable gatherings, this method of illumination is not entirely satisfactory for it is difficult to get a sufficient spread of light from a dome hung at the proper height. Nevertheless, the dining room dome still remains a relatively important piece of lighting apparatus. The old style art glass dome was satisfactory, provided it was hung at such a height that the lamps used within it were not visible to those seated around the table. If hung higher than this glare was introduced. On the other hand, the hanging height should not be so low as to obscure any portion of the party sitting opposite one. The Japanese wicker domes with fabric lining are particularly well adopted to this class of service. To obtain a maximum efficiency out of these units, it is often desirable to hang a dense opal reflector over the lamps This will direct the light downward on the table rather than allowing it to be absorbed in the fabric covering. It also prevents the filament of the lamp from being visible through the coverings.

Where a dome is hung so high that the lamps are visible, it is essential to cover the base of it with a piece of translucent silk. This may be tinted and in this instance, the warm tones are preferable as giving more pleasing appearances to the complexions.

Semi-indirect lighting is quite desirable in the home with a large family. This provides a relatively even distribution of light and is quite comfortable. A rather interesting example of this form of lighting was noticed where the ceiling was quite dark in color, in fact, a gray. A light density semi-indirect bowl was hung over the centre of the table. The light transmitted through the bowl itself produced a higher intensity on the table than produced in the remainder of the room on account of the low reflecting power of the ceiling. Even in rooms where wall switches are not available, it is a relatively simple matter to install semi-indirect lighting for a switch can be attached to the ceiling, controlled by a pull cord, this being cut in on the service to the unit through a hole in the canopy.

The candle stick has always held an appropriate place in the dining-room and it seems that this is one of the most logical places for the installation of the candle stick type fixture. If suitable translucent fabric shades are used with round bulb lamps and a candle stick fixture hung above the table, the maximum light will be directed down on the table top and a lower intensity prevail throughout the rest of the room. A scheme like this produces the same effect as the dome and yet gives a somewhat wider spread of light.

The lighting fixture should not serve as an outlet box or a place for the attachment of cooking devices. This is merely a makeshift arrangement. Baseboard receptacles or receptacles on the lower side of the table should preferably be installed.

In some instances preference is expressed for low intensity of general lighting supplied by wall brackets with diffusing glass shades, silk shades, or sconces. The illumination on the table top itself being provided by means of candles, either natural of electric.

In certain houses the construction is such that an art glass window is found above the buffet space. A pleasing touch can be produced by installing suitable angle reflectors and a number of low wattage lamps outside of this window. A ray of artificial light is directed downward giving the appearance of a beam of sunlight toned or tinted by the art glass of the window.

Pantry

It is quite evident that a relatively high intensity of illumination is desirable in the pantry to eliminate breakage. This can usually be accomplished by a simple type semi-indirect unit placed close to the ceiling. This can be obtained very inexpensively by utilizing a direct lighting opalescent glass bowl reflector and a harp type holder carrying this inverted below the lamp. It is often desirable to install wall outlets in the butler's pantry of a sufficient capacity for a small motor for polishing silver, an electric plate warmer, water urn or similar heating device.

Kitchen

The kitchen might properly be called the industrial part of the house and the principles of industrial lighting apply particularly to the kitchen. A high intensity of light of the proper quality will result in increased production, more uniform output and a higher quality product. Sanitation is enhanced with high intensity lighting, employees are better satisfied under the cheerful surroundings which result. Efficiency of lighting equipment is paramount in the kitchen. This is the one part of the home where it is desirable to get the maximum light on the work for the minimum expenditure of power. Direct lighting is most generally applicable. Inverted units in the kitchen depreciate quite rapidly an account of the prevalence of greasy smoke and the like, although lighting equipment of all sorts in the kitchen requires frequent cleaning. For most conditions, a simple stem or chain fixture with a dense opal or efficient prismatic reflector makes a lighting unit meeting the requirements outlined above. Two outlets are required in practically every kitchen. Satisfactory lighting cannot be accomplished in the kitchen with a solitary central outlet, particularly with direct lighting. With only one outlet in the kitchen when one is working at the stove, sink, or other pieces of furniture about the edges of the room, rather dense body shadows on the work are almost sure to result. The second outlet may often well take the form of a bracket fixture, the overhead outlet providing the illumination at the range, table and the like, the bracket outlet being over the sink.

Bedroom

The bedrooms in most of our homes are inadequately illuminated due to lack of forethought when the house was being built. In the less expensive type of residence frequently only one wall bracket outlet is provided. This may give reasonably good light at a dresser or chiffonier, but does not by any means fulfill the demands of the bedroom. A moderate intensity of general illumination throughout the room should be provided with more intense local lighting at certain spots. One of the most satisfactory means of meeting this end is the installation of a central ceiling outlet with suitable equipment. The local lighting is taken care of by bracket outlets and portable lamps. The lighter tones of wall paper and decorations prevail in the bedroom or boudoir, and in general a definite color scheme is carried out in all the decorations.

It is a most simple matter to carry this harmony through the lighting equipment. Etched and tinted glassware of infinite variety is standard and readily available. Some of the most beautiful examples of American glassware are to be seen in the equipment designated for boudoir use. Dainty, delicate floral decorations abound as well as the more conventional patterns. The better quality of this glassware is most artistic from every standpoint and very appealing. It is true that the high grade decorated glassware is somewhat more expensive than the type of shade ordinarily encountered in residence lighting but the personal satisfaction of having a unique and thoroughly pleasing installation certainly overbalances this. These semi-indirect bowls and shades are obtainable in various styles and a variety can be introduced from one room to room. The portable lamp shades should be chosen to match both the central and wall units.

A haphazard selection of design of decoration should not be made. It is desirable to do a little shopping and find the particular unit which is most appropriate. This point cannot be too strongly emphasized for in this manner the most charming effects can be secured. A study of the glassware catalogues of the more progressive manufacturers of decorated and tinted glass reveals some of the possibilities we have been trying to bring to your attention.

The side wall or bracket fixtures should be located near the dressing table, dresser, or chiffonier. A baseboard outlet is most desirable in the bedroom for the attachment of portable or reading lamps, heating pad, sterilizer, vibrator, curling iron, milk warmer, or other electric conveniences.

Where the room is used at a sewing room a convenient outlet should be placed to which the motor for driving the sewing machine may be attached as well as a local light for sewing at night on dark goods. The reading lamp is often attached to the head of the bed or placed at a table at the side of the bed. Where only bracket outlets are available and it is desired to get a certain amount of general illumination, it is good practice to utilize open bowl reflectors of a rather wide type and turn the bracket so that it points upward. In this manner, a semi-indirect effect is secured without resorting to a ceiling outlet, sufficient light, of course, being transmitted through the shade to provide the higher intensity at the dresser or bed.

By way of variety, it is often desirable to utilize fabric rather than glass as the diffusing medium. Silk shaded wall units, central fixtures, and drop lights give excellent results, for variety rather than monotony should be the byword of the lighting specialists.

It is desirable to provide an outlet in the clothes closet as this space is usually quite dark. This outlet should be located in the ceiling and may or may not be provided with a reflector, depending on the ceiling height. If no reflector is used, then the lamp, usually of low wattage, should be all frosted. The use of a door switch or control of the light is a great convenience but the pull chain socket is quite common practice.

Bathroom

In the bathroom, the most exacting requirement is the suitable illumination of the face for shaving. If only one outlet is available, it is then desirable to provide two mirrors, one on each side of the lighting unit, although a much better practice is to have a bracket outlet at each side of a single mirror. A simple type of semi-indirect unit in the centre of the bath room ceiling is also very satisfactory. This provides excellent light for dressing the hair as well as for shaving. The usual white finish of the bathroom gives excellent diffusion to the illumination, eliminating annoying shadows and providing plenty of light from the side. In locating the bracket outlets for the bathroom care should be taken so that these are not opposite the window, thus avoiding shadows on the window shade. A wall receptacle with sufficient capacity for an electric heater, massage vibrator, shaving mug, hair dryer, or luminous radiator should be a feature in the well equipped bathroom.

Cellar

This is usually the work shop of the residence, and good illumination should be provided at points where the work is done. The lighting should, of course, be entirely utilitarian as the decorative element does not enter here. Porcelain enameled steel reflectors with bowl frosted lamps at strategic points such as the work bench, furnace, etc., cover the lighting requirements of the cellar.

One of the outlets in the cellar, preferably the one at the foot of the stairs, should be controlled by a switch located at the head of the stairs. This insures sufficient light in the cellar to avoid accident. It is desirable to provide wall outlets for the attachment of grinders, buffers, drills, and the like.

The laundry is frequently located in the cellar in the form of a separate room. Good general illumination should be provided in this space and so arranged that shadows will not be cast when working at the ironing board, washing machine or tubs. Wall outlets should be provided in the laundry for the attachment of iron, washing machine, mangle etc.

It is obviously impossible in the time available to cover all phases of residence lighting or even to analyze completely the possibility of illumination applied to any one room. The authors trust that they have given a very brief bird's eye view of this broad question and awakened an interest in a feature of home planning which they are absolutely convinced will produce more comfort and satisfac- [illegible]

Toronto Contractors Skip February Meeting and Will Meet March 4.

Owing to the illness of a number of members of the Toronto Section of the Ontario Association of Electrical Contractors and Dealers, the February meeting was cancelled. The postponed meeting will be held on Thursday, March 4th, when the members will meet again in the Hotel Mossop at 7.30 p.m. dinner. The chairman, Mr. Kenneth A. McIntyre, reported by letter that negotiations were proceeding in the wage matter, and that a settlement should be reached in the near future on the basis already recommended. Mr. McIntyre also announced that the Toronto District Association is to be formed April 1, 1920, at which time it will be necessary to elect officers, including a chairman, secretary, treasurer and a district executive committee of three. At the March meeting a by-law will be presented, establishing the Toronto District and a nominating committee will be appointed. Messrs. George T. Dale, R. A. L. Gray and H. A. Rooks have been asked to serve as a committee to bring in the report suggesting a list of subjects and items to be covered by the special sheets for the use of the Toronto members in connection with the Univer- [illegible]

Advertising That Pays — Don't Spend Your Money Uselessly—Some Pertinent Questions the Electric Dealer Should Ask Himself

There has never been a period in history when advertising was more popular than it is today, or more of it done. Yet if it is true that there is nothing new under the sun, even the old prehistoric men must have adopted some method of advertising the particular thing they were most interested in. One can picture Mr. Hardhitter advertising his latest mammoth jawbone club, by a neat tableau outside the entrance to his cave. Lying on the ground with his skull crushed in is Mr. Canit., Mr. Hardhitter's investerate enemy. One of the jawbones is lying beside the corpse Or:

In the middle ages Mr. Fitzsticker would have an herald ride through the cities announcing that he was prepared to meet all comers with the lance, sword, or dagger, and kill, wound, or otherwise disable all, and everyone, who dared to accept his challenge. The entertainment would provide all the excitement required by both ladies and gentlemen and anyone else who cared to come. The entrance fee would be a crown per head.

At all events Nero could hardly have found a surer way to publicity, than by fiddling before burning Rome, especially after being responsible for the fire. In his case publicity didn't pay but he achieved his object, which after all is the important thing.

The kind of advertising which pays best depends greatly upon the class of goods offered for sale. It is obvious that a grocer and a tailor would not use the same form of advertising. The class may be the same, that is they may both use the newspaper as a medium but the advertisement would be of a different style. Every trade has its own system which, while based upon the general principles of advertising, is in some respects peculiar to itself. The necessary thing then, is to ascertain certain information before deciding upon either class or form. The information necessary for the electrical dealer is:

What class of people do I want to reach?

What funds have I at my disposal for advertising?

What class of goods am I intending to stock, and feature?

Then study up the systems of advertising in vogue and especially the methods adopted by other dealers, not with the idea of adopting their methods, but to pick out the best points of each, and utilize them for your own benefit. Above all it is essential for the dealer to, as far as possible, place himself in the position of a customer. He already, by experience, has a knowledge of such goods, and their value from every standpoint, what he wants to learn is, what does a prospective customer want to know? and when he has found that out, he is better fitted to consider the kind of advertising most likely to bring him the best results.

The system he finally adopts will depend largely upon the amount of money he has at his disposal for that purpose. Of course his window display will be one of his best means of advertisement but even that will cost money, in time and a certain amount of decorative material.

Newspaper advertising is considered by all as being the most fruitful of the outside methods. It reaches so many people and is only composed of a few pages. The advertisements are mixed with the news, and thus rarely escape notice.. Then too everyone these days, is educated to read advertisements, more particularly because of the nature of them. That is the first point.

The second and most important point is to have it worded in such a manner that it will be remembered. It is certain that the greatest part of printed matter is rarely remembered by any but the few particularly interested. Advertising needs to appeal to the **many.** To make this possible it should be terse, pointed, give real information, and arouse curiosity. It is well to remember that unless newspaper readers are particularly anxious to know about certain articles they will pass over a lengthy advertisement without reading it. It is the indifferent person who does not realize the value of certain merchandise to whom the advertiser must appeal. This can only be done by brief arresting advertising.

The Power of Curiosity

Many firms sell the same article but each firm is anxious to have it known that they can give the best satisfaction. One English firm adopted a novel method to attract attention to their store. It was at the time that aeroplanes were first being experimented with. This firm had a large box kite made annd flown from the store. It was attached to the building by a light but strong cable. Fastened to the cable at varying distances was several large streamers, on which was printed the name of the firm and a few special lines, on sale. These could be seen for miles.

Another scheme adopted by an enterprising firm was to have a man dressed in college gown and cap standing in front of their store. In his hand was a large book on which he kept his eyes fixed, excepting for short intervals when he would gaze into the sky at the same time slowly turning round as if in search of something to which his book referred. On his back was a placard stating the name and prices of certain articles and the name of the store at which they could be procured. The man was always surrounded by a large crowd.

Since the days of Adam and Eve curiosity has led people to do, often what they are really not anxious to do. It is a habit, disease, call it what you will, of which people will never be cured. It is the advertisers strong point.

It is to be remembered, though, that advertising is not selling, and is only for general publicity. And yet this is not altogether true. There is one system which gives both publicity and often sells the goods. This is called "Intensive Advertising" and means that a city is divided up into districts and each district is canvassed by specally trained men. A firm adopting such a method gets the name of being always on the job, and can be depended upon. Such canvassers though, must not allow their eagerness to sell, lead them into becoming a nuisance by their persistency. Remember that if a woman is busy washing, or doing many of her other household tasks she will not wish to be kept from that work by an overzealous canvasser. Under such circumstances he should leave at once but if possible fix a time to call again. Or he may want to call again with another article, at some later date and if he has on a previous visit considered her convenience, will receive a good reception.

It has been suggested, and with some truth, that advertising is of little value without the demonstrator. Advertising calls attention to an article, but the demonstrator shows its good points.

Pamphlets enclosed with goods is a fruitful source of advertising. By this means a customer is kept informed as to the latest and most up-to-date goods.

Good results can be gained by utilizing one method to help another. For instance suppose a firm was to advertise in the newspapers something like the following:

IF YOU ARE INTERESTED
in seeing something
YOU have never seen before
and which has
NEVER before been seen
by
any person LIVING or DEAD.
take a look in the
WINDOW
of
BROWN'S ELECTRICAL STORE.
23 Drummond St.

The window should be arranged in the following way:

At one side of the window seated at a table should be a demonstrator cracking nuts and holding up the kernels for inspection. That would be the thing never before seen. In the other corner have another demonstrator, mixing and baking cake in an electric stove. She should use some of the nuts. The newspaper announcement would bring the crowd, and the demonstrator do the rest. It would add to its value if the dealer had either, boys distributing leaflets, or a salesman outside, to answer questions.

The main point is to attract the crowd, show the goods and demonstrate their value.

"Demands" of Electrical Unions

Representatives of unions of the various electrical workers organizations met in Toronto recently and prepared a program of demands which, it is understood, they will present to the Provincial Government. These demands include a licensing system for both contractors and workers; a uniform wage for the province; certain changes in the installation of distributing systems; certain amendments to the Workmen's Compensation Act and representation upon provincial and municipal hydro-electric commissions. It is proposed to inaugurate a licensing system under which employees shall serve a four-year apprenticeship before they receive a certificate of qualification and become regular journeymen. The officers elected for the year are: A. Morrison, president; W. G. McCallum, Toronto, secretary; T. Seager, St. Catharines, L. Smith, London, and A. Moore, Sudbury, vice president.

Uncle Hiram Perkins' Homely Advice

Uncle Hiram walked into Brown's electrical store the other day to buy a bulb. The assistant was rather slow, as usual, in serving him, so Uncle Hiram says: "Guess I'll do another little errand while yer mak that bulb fer me. Hev it ready time I git back."

The old man trots right across the road to the hardware store and buys a tin of softsoap, then returns to Brown's. Taking up the package now ready for him he very gravely hands the tin of soap to the clerk.

"Say what's the big idee, Uncle."

Uncle slowly shook his head and then looked at his questioner and said: "Wal Bob, ef yer don't git the idee I guess I'll hev ter speak more plain. Fact is I figured as how yer'd hev to cross the tract on yer way home, and as 'twill be bout time for evening express, a little soap on yer boots wouldn't hurt none, to git yer over safe."

"Durned old interferer," said Bob, realizing at last Uncle Hiram's meaning. But the customers noted, from that time, an improvement in Bob's methods of serving.

The Awakening of Dealer "Lumsden"

Takes the Advice of His Salesman Friend, Mr. Brown, and Finds His Business Increasing Beyond His Highest Expectations

Harry Brown was salesman for a large electrical wholesale firm. He was more than that; he was a **good** salesman, for he studied every side of his business, and allowed nothing, that had any bearing upon electric supplies, or salesmanship, to escape his notice. In his early selling days he had learned, among other things, that a good window display meant added business to any store, and also, that a great number of retailers did not realize the truth of this.

Some weeks previous to the incidents related in our story Brown had persuaded one of his old customers, that a dirty store window and a jumbled display of goods, was hardly an attraction to a prospective customer. Moreover, he pointed out that many a person, looking into a store window without any intention of buying, had been enticed into the store by the attractive array of specially useful and up-to-date articles. Few people can resist an appeal, and most inanimate objects can, by skillful arranging, be made to appeal strongly. Mr. Lumsden had promised to give scientific window dressing a fair trial, and Brown had left him, satisfied that the result would be—increased business.

It still wanted a month before Brown was due to make another business call upon this customer; but, curious to know the result of Lumsden's experiment he decided to pay him a friendly visit. One fine evening he walked from his boarding house to the store of Mr. Lumsden. His way lay through a residential section of the city with at least one good shopping street; but nowhere did he pass a store which displayed electric supplies. This gave him something new to think about in the way of suggestions for Lumsden.

On arrival at his destination he immediately noticed that his friend had taken his advice. The windows were clean, and well lighted, and the merchandise attractievly displayed. Several customers were in the store and Mrs. Lumsden was helping her husband to serve them. This in itself was something new, for Lumsden, previous to his altered window dressing, never found himself too busy to attend to all customers.

Brown walked into the store and waited until his friend was free. In the meantime his observant eye noted that the window was not the only part of the store that had undergone the process of change and improvement. In addition, too, he noted that the stock was fast diminishing. Free at last, Lumsden turned to Brown with evident pleasure and satisfaction and greeted him with:

"Hello, Brown, what brings you here after business hours! Meet my wife. This is Mr. Brown, Mary, the gentleman who gave me the good advice about window dressing."

"I believe we have to thank you, Mr. Brown, for the added business which has come our way this last few weeks; but well, when you two have finished talking come into the living room and I will give you some coffee. I am behind with my work and must do it now."

She tripped away and Lumsden, with a twinkle in his eye, said:

"Brown, old man, you are in for trouble. Ever since I carried out your advice business has steadily improved. We are now drawing a better class of customer, and are being asked for things for which I have never before had a demand. It has been necessary for my wife to neglect her own work in order to help me."

"Why don't you get an assistant?"

"Because I want to be certain that this is not merely a temporary increase."

"Well, then! get a servant for your wife."

"It is quite easy to see that you are not a married man, otherwise you would know that servants are more scarce than radium. Haven't you a better suggestion than that?"

"Surely! To help solve the servant problem, you suggest to your customers the use of electrical labor-saving devices, do you not?"

"Yes."

"Have you provided them for your wife?"

"Why, no; not yet. In fact, to tell you the truth, business, until your last visit—was not making me sufficient money to warrant such expenditure."

"Well, now that business is improving, why not do as I suggest, and thus leave your wife more free to give you some of her time, besides relieving her of much of the hardship and worry of household tasks?"

"By hokey! I'll do it," snapped out Lumsden; "the success of your previous suggestions has put new life into me, and," he added, with a laugh, "it will save you from a scolding when we join my wife."

"Good! Now I will give you another suggestion, if you wish."

"As many as you like."

"As I was walking to your place I was surprised to find that your's is the only store for the sale of electrical goods between here and the city. Why, man, if you do a little canvassing you could, in a short time, work up a tremendous business."

"What time have I got for canvassing?"

"Utilize your half holiday each week, and I will guarantee that in a few months you will be able to afford an assistant in the store, and thus be free to spend part of your time canvassing the district."

Lumsden thought for a moment, and then said

"I believe you are right, Brown. At all events I will give it a trial. Now, before we go for that coffee I suppose you don't object to

HELP! HELP! After following your good business advices M' Brown the entire stock has been sold right out
GOOD!
NCREASED BUSINESS TIPS

Lumsden creates a greater demand than he can supply

The window display shown herewith is that of Mr. Grinyer, of Guelph, Ont. Mr. Grinyer's window was a runner-up in our best window contest, and only lost out because the judges thought the prizes should go to a purely electrical display. It will be seen that the left side of Mr. Grinyer's window is a music-box display.

taking an order at this time of the evening?"

"You can just bet your boots that I have no objection," smilingly retorted Brown, and in a few minutes both were engrossed in their task.

Business over, Lumsden led the way into the living room, and immediately told his wife about the labor-saving devices he intended to install in the house, adding that Brown had made the suggestion.

"Well then, you can commence right away by bringing me in one of those percolators we have in the store," and we'll have some coffee. Then, turning to Brown, she said with a smile:

"We sure do owe you a heap of thanks, Mr. Brown."

"Not at all. I am only too glad to be of service to you."

"Besides," he added, "I benefit with you."

"Oh, well, we will leave it at that. Supper is ready, make yourself at home."

During supper they chatted pleasantly and afterwards Brown walked home to his boarding house, highly satisfied with himself and the world in general. He had helped a good customer and, incidentally, swelled the amount of his own commission.

As he rushed up the steps, two at a time, and fumbled with his latch key, he muttered:

"Gee, it's funny how often chasing up business finds you running plump into pleasure."

Salesmanship from the Standpoint of the Consumer

To the average purchaser it would appear sometimes that the retailer, when buying, fails to remember the person to whom he expects to sell his merchandise. He seems to have allowed his personal taste, rather than the application of experience gained through years of selling, to influence him in the choice. Does this explain some overloaded shelves?

To the good business man, however, there is only one criterion for buying: what the people know they need, plus what they need and don't know. The first class of articles sell themselves, but the latter class taxes the judgment of the dealer to the utmost when buying, and then requires expert salesmanship for its disposal. This class of article represents the growing end of the business, at least today; to-morrow it my belong to the staple class, with something new in view. It is obvious how important the salesman beomes in this type of business. In short, he must first convince the people that they need these goods before he can hope to sell them.

Correspondingly there are in general two kinds of customers; the first kind who know what they want and will not be satisfied with anything else; and the kind who allows the salesman to do both the selling and choosing. In the case of the former, most of the responsibility is taken from the salesman, but in the latter case he finds that he needs wisdom, tact, perfect knowledge of his goods, and many qualities not always possessed by mere man, before he can hope to successfully clinch most of his sales. The majority of men behind the counter, would be well advised, then, if they took more pains to consider the position of the customer.

Some Causes of Dissatisfaction

Much of the dissatisfaction which results in "no repeat orders" most assuredly comes from the attitude of the salesman rather than from the poor quality of the goods. Every prospective buyer is to a more or less degree, affected in their buying by the personal attitude of the salesman. This may appeal to some as being an exaggeration, but a study of their own experience as customers will convince them that the bearing, attitude, voice, and even the looks of the clerk will often influence buying. At the same time this does not exclude the homely man from such a job, for "Handsome is as handsome does" is absolute in salesmanship. It simply means that the man or woman with a sneering, repulsive expression will materially affect the bulk of the sales. It is a case of irritation, instinctive perhaps, but nevertheless real, and no buyer wishes to be in continual state of irritation and restlessness while attempting to choose an article. The result will be either that they will leave without buying, buy hurriedly and most likely something that does not suit them, or in spite of their feelings stay and choose what they desire; but, the final result will be the same in each instance: they will never return unless it is for something which they cannot obtain elsewhere. This may be considered as sentiment, but most dealers, after all, are aware that a great deal of sentiment enters into buying and selling.

Another cause for dissatisfaction to a customer, is to enter a store with only a few minutes at his disposal and to fall into the hands of an orator. Solomon made it clear that there was a time for every thing, and made a special reference to speaking out of place. Probably he had been troubled, when out shopping with one of his numerous wives, or perhaps it was his experience to sometimes hear all of his wives speaking at the same time; at anyrate" a time to keep silent and a time to speak," was his injunction. There may be a few who like a talkative clerk to attend to them, but for the most part this is not so. With most people shopping is a serious business to be accomplished as speedily as possible, and they like their wants to be served with as little eloquence as is absolutely necessary.

Neither do people like to be bullied into buying. Unfortunately, nature has endowed some people with an abnormal sense of fear; fear of what others say to them, of meeting people, of buying, of bargaining. Their mental anguish on being compelled to make up their mind in the presence of a multitude of considerations is a strain not relieved until their task is complete. This class of people, happily, is not large. Some men in particular can discuss business with the most autocratic of their business acquaintances, but when it comes to entering a store and buying some article, they are consumed with a dread that is pitiful. The result is they usually enter the store, ask for the article they want and take the first one offered to them without ascertaining whether or not it is suitable, with the result that often they are dissatified with the goods. Because the one big thing a dealer aims for is to give satisfaction, his clerks must be trained to read character, and set at ease this type of customer.

It is a big mistake to think a perfect knowledge of the merchandise is all that is necessary for successful selling. Tactfulness and courtesy are absolutely essential and can be considered as two assets of diplomacy. There is no sphere in life where diplomacy is not a value, and to the customer it appears to be very necessary. Most purchasers will go out of their way to visit a store where previously they have been treated courteously. It may be months afterwards, but most assuredly they will return.

Salesmen

Some salesmen remind one of the professional guide in Mark Twain's "Innocents Abroad." They have learnt a speil in conection with the object they are selling, and reel it off at one hundred and fifty to the minute, without the slightest attempt at expression, or of showing any intelligent knowledge of the goods in question. That is not showing a knowledge of an article, and deceives no one, most certainly not the customer. Such a spiel bespeaks lack of intelligence—an attitude fatal to successful selling.

It is well to remember that a clerk in a store has a big advantage over the salesman on the road. The latter has to seek out his customers; on the contrary the customer visits the former and thus half the battle is won. After that it is the clerk's own fault if he does not sell, assuming of course that the customer is not merely looking round. He must, however, avoid the danger of arousing suspicions of his intenton to sell.

Never consider an order too small to be as assiduously attended to as large orders. In the first place, small orders amount up to large proportions in the course of a year; and secondly, the small order may be but the forerunner of a large one. It may perhaps take a long time to sell a small article, but it is more than possible that the clerk is but paving the way for other orders; in reality partly selling them before hand. It is not so hard to convince a customer of the worth of your opinion, on the second occasion, as it was on the first. If a reputation for honest dealing is once established it is not easily lost.

One point so often neglected, especially in electrical goods, is the fact that a certain fixture may be beautiful in design, splendidly made, and in every way artistic, but, when installed in a room with wallpaper and other decorations which clash, be utterly out of place, besides spoiling the appearance of the room. The salesman, then, should encourage customers to tell them of their room designs, and if at all possible, arrange to have an expert visit the home. It may be pleasant to clinch sales at once, but once again it is a case of the possible dissatisfaction to the customer, and, as a consequence, no repeat order.

There are a few questions which it is always wise to ask:

In the case of fixtures:

What color is your wall paper?

What is the general design of the room for which you want the fixtures?

What size is the room?

Are there any other fiixtures in the room which you intend to retain in their present position?

Or if you are describing a washer:

What size is your laundry

Have you a deep sink in the laundry?

and many other questions which the particular kind of goods should necessitate. Of what use is it trying to sell a washing machine, or dishwasher, or ironing machine to a person living in a small flat with only a kitchenette in which to do the household tasks, a place so small that they can hardly find room for the dishes, let alone a dishwasher.

Another suggestion is to make a note of all pertinent questions which customers sometimes ask, and for which the salesman may not happen to have an answer at the moment. Obtain the answer at the first opportunity and if in the estimation of the dealer it is of importance to the customer, he should take steps to inform him. Under any circumstances the question will probably be asked by others and it is well to be primed. The point is, to make customers feel that the dealer has their interest at heart. It is not a matter of conferring an honor, but is strictly business; the best merchandising. The average customer appreciates anything that is done to make buying easy for him.

The dealer should keep a list of his best customers, and when anything new or useful comes into his stock, send them notice of it. The motto must be always on the job.

Cutting prices is not generally wise, for it immediately suggests to the prospective customer the following ideas:

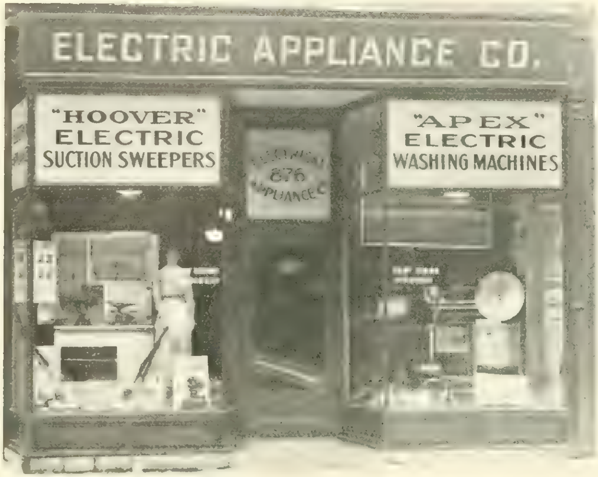
It must be old stock.

It must be damaged.

It must have gone out of fashion.

Somewhere there is a flaw in the making.

Or, it probably does not do all that it is advertised to do. In short they become suspicious that somewhere there is a nigger in the fence. On the other hand if a retailer has


ELECTRIC APPLIANCE CO.
"HOOVER" ELECTRIC SUCTION SWEEPERS
ELECTRICAL 876 APPLIANCE CO
"APEX" ELECTRIC WASHING MACHINES

Here is a window that may well be considered a member of the sales staff. Note how fully it gives the impression that electric devices do the "work" in the home.

an article at a price much higher than his competitors he must have a sane logical reason for it.

He should remember, too, that the majority of buyers like to go where there is a big choice of goods, but at the same time, he should always have a tasteful display of a few of the best.

One of the largest business houses in Canada has a motto which, in effect reads, "the customer first, last, and always." With them it has proved a huge success, and whether the firm is large or small, it will work equally well with either.

To the retailer, then, his four greatest assets are:

His window display.

The quality of his goods.

His reputation for never going back on his word.

His salesmen.

Recently Established Store in Montreal Makes Specialty of Electric Sweepers

Messrs. Mainer and Hill, under the name of the Electrical Appliance Company, recently opened an electrical supply store on St. Catherine Street, West, Montreal, making a specialty of electrical sweepers. This is probably the only store of its character in the city, and its existence is significant of the ever-increasing use of electrical household appliances. The public are appreciating more and more the economical, labor saving, and sanitary values of electrical sweepers. Messrs. Mainer and Hill state that the demand has more than fulfilled their expectations, and that the demonstrations have proved very effective in closing business.

The store has an attractive window display, the interior and the demonstrating room making an excellent back-

A very successful interior layout. Everything is ready for demonstration work. The table with a sweeper on it so that the customer may make a careful examination is a good idea. Note also the attractive showcase.

ground. One of the features of the window is the Hoover Suction Sweeper. Electric irons, toasters, etc., are also arranged in a most effective manner in the window. In the store itself, a special section is devoted to the exhibition of Hoover sweepers. The other side is reserved for other household appliances, including electric washing machines and electrical heaters. Behind the Hoover section is a large showcase, with flashlights, tungsten lamps, etc.

The demonstrating room occupies the rear portion of the store. The floor is carpeted, on which the customer is shown the effective manner in which the Hoover suction sweeper works. In the same room the Apex washing machine is also demonstrated.

The store is fitted with indirect lighting fixtures which reflect on a white ceiling, thereby lighting up every corner of the store.

The chief feature of the Hoover sweeper is that it beats the carpet besides cleaning and sweeping it. Another point is that the switch is placed down close to the motor, thereby avoiding breakages caused by the handle being dropped. In a demonstration, cotton wool was rubbed into the carpet. The sweeper was then passed over it once—not even a hair of the wool remained on the carpet. There is a Hoover made for every size and task; the "Baby" Hoover for a small home or apartment; the Hoover "Special" for medium size home or apartment; the Hoover "Junior" for large home, or where the work demands a bigger machine; and the Hoover "Senior," made for hotels or public buildings. The Hoover "Senior" is the most powerful, while the Hoover "Special" is the most popular model. The Hoover sweeper carries with it eleven attachments, a different assortment being selected to go with each of the four models.

Company Made a Fine Record

The Board of Directors of the General Insulate Company, Brooklyn, New York, the well known manufacturers of "Insulate" and "Hi-Heet" specialties of composition, at the company's annual meeting held Jan. 15th voted to increase the capital stock issue of the company from $50,000 to $250,000 to more nearly approach the company's assets. The directors at the same meeting voted an 8 per cent. bonus from the earnings of 1919 to all factory and office employees of the company based on their earnings and efficiency standing for the year past, and in accordance with the co-operative plan adopted by the company's directors several years ago—General Insulate Company having been a co-operative company these several years past. This annual bonus to the employees will range up to $200 for the older and more experienced employees. Needless to state this generous distribution on the company's part meets with the heartiest appreciation of all the employees. In making the annual report to the Board of Directors of the company's operations for 1919, the managing director, Mr. V. C. Rockhill, made the statement that in the two successive years of 1918 and 1919 the company's net sales did not differ by $1000. Inasmuch, however, as the General Insulate Co. throughout the year 1918 had devoted all its energies to Government work in connection with the war, (nearly 90 per cent. of the company's 1918 output being for the government), the company's directors feel it quite an achievement to have been able to completely switch the company's output in one year to all commercial work without having lost any ground. This company reports that it had booked, on Jan. 1st, the greatest volume of orders ever on the company's books at the same period.

The Cranbrook Electric Light Company are installing a Delco battery [illegible]

Canadian National Carbon Extensions

The Canadian National Carbon Company, Limited and the Pest-O-Lite Company of Canada, Limited, recently jointly purchased the westerly ten acres of the property at the southwest corner of Bathurst street and Davenport road, in the city of Toronto, known as the Hillcrest Driving Park, as a site for a large new manufacturing plant.

The Canadian National Carbon Company are manufacturers of the well-known Columbia and other dry batteries, Columbia storage batteries, Eveready, "Daylo" flash lights, carbon brushes for electrical machinery, electrodes, etc. The Prest-O-Lite Company are manufacturers of the Prest-O-Lite storage battery, also welding and cutting apparatus, dissolved acetylene, gas tanks, lamps and other automobile lighting and starting accessories and apparatus.

The new plant which is being erected in Toronto at once will consist of two buildings, one of which will be 80 feet wide by 400 feet long, two storeys high with one section 80 x 80, three storeys high, to be occupied by the Canadian National Carbon Company. The second building for the Prest-O-Lite Company will be 80 feet wide by 400 feet long and two storeys high.

The heating plant will be housed in a separate structure, 50 x 60 ft., and will have room for installation of additional boilers for future units to be added.

All the buildings will be of reinforced concrete frame, flat slab floors, mushroom type columns on twenty-foot centres, steel sash and brick curtain walls.

It is expected that the plant will be ready for occupancy in May, 1920, and everything possible will be done to get it ready by that date.

Mr. R. H. Combs, who is general manager of both the Prest-O-Lite Company and the Canadian National Carbon Company, states that his companies expect to employ about five hundred people as soon as the new plant is ready to operate, and that the facilities provided by these first two units will take care of upwards of 700 employees if needed.

The area secured is sufficient to take care of six such factories as the two now under construction.

In addition to the large plant described above, Mr. Coombs states that his company will erect in the spring a new acetelyne gas plant in Toronto or immediate vicinity, to take care of the greatly increased demand for compressed Prest-O-Lite gas for welding and cutting, and that a large new storage battery warehouse and assembly plant will be erected at Winnipeg.

Description and Characteristics of Lead Cells

(Concluded from page 38)

siderably and shrinks on charge, thus the regular cycle of charge and discharge tends to crack loose small particles from the mass particularly of the positive plate on account of its comparatively hard and unyielding material, while the sponge lead of the negative on account of its soft and spongy nature can change its volume easily without shedding.

High density of the electrolyte causes excessive sulphation of the negative plates. Impurities in electrolyte generally corrode and, eventually disintegrate the plates, fill up the pores and decrease capacity or cause local action as previously pointed out.

Moderate rates of charge and discharge allow the contraction and expansion of the active material to take place slowly. This is particularly important on charge, as when the contraction of the active material takes place slowly the lead peroxide does not crack or shed so much as when the charge rate is high.

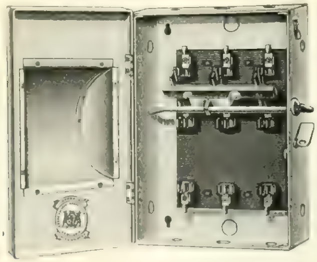
The sooner a battery can be charged after the end of discharge the more satisfactory will be its operation and the longer its life.

Wireless Sets for Amateurs

The A. C. Gilbert-Menzies Co. Ltd., Toronto, are putting out a very ambitious range of wireless sets for amateurs this year and judging from the response received from advertisements in the Saturday Evening Post, Popular Mechanics, and Boys' Magazines, are quite optimistic that this will become a splendid line for the trade to handle all the year round. In addition to the small amateur sets that were marketed successfully last year they are putting out receiving sets that will pick up messages with a range of 500 to 1000 miles and transmitting sets with a range of 3 to 5 miles. The illustration shows a combination receiving & sending set. The sale of these amateur sets is not confined to boys and youths but is evidently popular with men and young ladies. Also particularly so with returned soldiers and sailors who had wireless experience in the war.

An Electric Galvanized Box

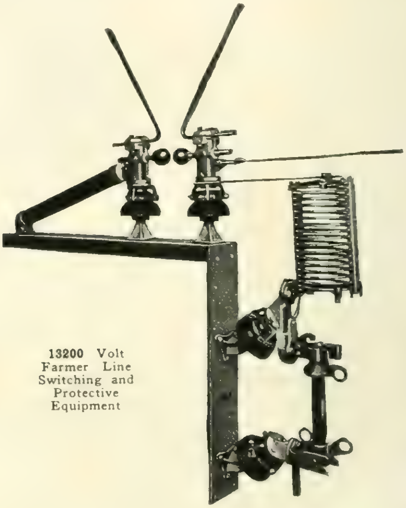
Canadian Drill & Electric Box Company have issued an attractive catalog entitled "Electric Switch Boxes—The 20th Century Line, Electric-Galvanized." The steel enclosed switches of this company are designed for use in connection with service and industrial installations wherever it is desirable to completely enclose all terminal wires and live parts, for the advancement of safety first principles; standardization of equipment; the prevention of tampering with circuits and the elimination of instant hazards. The service boxes are galvanized in the company's own plant, after the boxes are made up, so that there are no flaws, no edges not galvanized. It is claimed that this process of galvanization will not chip and is rust proof.



At a meeting of the Council of the American Institute of Consulting Engineers, Inc., held on January 20th, 1920, the following members were elected to offices: Alexander C. Humphreys, S. Whinery, F. A. Molitor, secretary and treasurer, 35 Nassau St., New York.

Supplying the Farmer

The experience of the past seems to indicate that the farmer, as an individual, is probably a larger consumer of power than any other trade or profession. Nor is there any doubt that agricultural activities will be carried out upon a more intensive scale in the future than they have been in the past, which will mean a more extensive use of electric power. Throughout the country high tension lines of central stations are being extended past the farmer's front door and the only problem that remains is the application of simple, compact and fool-proof switching and transformer equipment to serve the farmers' needs. The illustration herewith shows a switching and protective combination design of the Electrical Engineers Equipment Company, of Chicago, for use on farmers' lines. It consists of sphere gap lightning arrester of the permanent resistance type, choke coil and fused disconnect. This equipment can be mounted on one pole and tapped to a through running line. It is built for all standard voltages up to 22,000 volts.


13200 Volt Farmer Line Switching and Protective Equipment

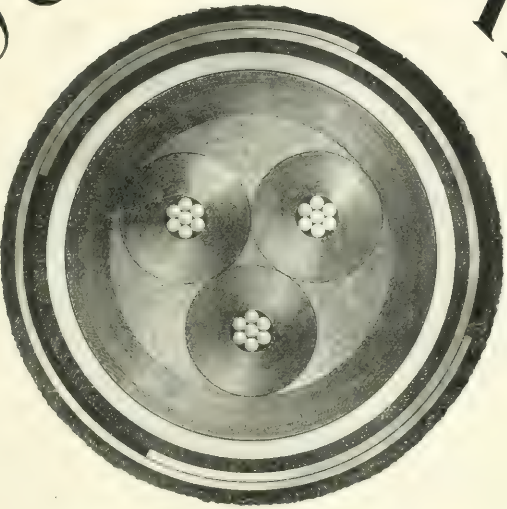
Fifteen Seconds to Renew a Fuse

The Pierce Fuse Corporation, of Buffalo, N.Y., states that it requires just 15 seconds to replace a blown fuse by a new one, using their renewable type, and that the only tool you need is an ordinary screw driver. There are no loose pieces to get out of place and nothing to delay the operation. It's simply a case of inserting a new fuse link, slipping the outer casing back in place and immediately restoring the fuse to use.

A "Made in Canada" Celebration

The Hoover Suction Sweeper Co. of Canada, Limited, entertained a number of friends as guests at a dinner in the Royal Connaught Hotel, Hamilton, on Thursday evening, Feb. 12. The event was to celebrate the inauguration of the production of "made-in-Canada" Hoover Suction Sweepers. The guests assembled at the factory at 4 o'clock and, after looking the plant over, were driven to the Royal Connaught

PHILLIPS'
ARMOURED CABLES



No. 2 B. & S. 3-Conductor 25,000 Volt Cable

Paper Insulated, Lead-covered, Double Steel Tape Armoured

Supplied to the Order of
The Quebec Railway, Light, Heat and Power Company

Eugene F. Phillips Electrical Works, Limited
MONTREAL

Branches: Toronto, Winnipeg, Regina, Calgary, Vancouver

New Warehouse of J. H. Edmunds & Company

Owing to the rapidly increasing business of this firm it was found necessary to abandon the old factory at 22 Orillia Street for more commodious premises, resulting in removal to the New Gilbert Block, 225-227 Richmond Street West, where ample floor space was secured. The location is one of the most desirable in the city, being on a prominent business street, quite central and convenient. The installation of considerable new machinery and modern appliances places this firm in a position to meet the most exacting requirements of the trade in electrical lines, appreciation of which has already been demonstrated to such a market extent as to necessitate increasing the original capacity of the factory by the acquisition of the adjoining basement, where, in the near future, it is the intention to install additional machinery. In addition to the manufacture of "up-to-the-minute" electric lighting fixtures, metal spinning in all its branches, the operation of a modern plating plant, etc., the firm is rapidly developing an extensive jobbing business in commercial lighting units and specialties, of which a large and well-assorted stock is always on hand, assuring prompt delivery—an important feature in these days of delay and uncertainty. The spacious and well-appointed showroom where lighting fixtures of the most modern type are attractively displayed, is on the first floor front, as also is the office. A cordial invitation is extended to all interested in electrical goods to drop in and get acquainted.

Ferranti Meter & Transformer Co.

The name of the Ferranti Electrical Company of Canada has been changed to read "Ferranti Meter & Transformer Manufacturing Co., Ltd. Their factory is at 26 Noble St., Toronto, and one of their special lines is a single phase pole-type transformer with welded steel case and cast iron cover. These are being built in standard sizes and are claimed to have big advantages over the cast iron case in that they are lighter in weight and overcome many of the well-known difficulties of the cast iron case.

Mr. Forbes C. Grassick, who previous to the war, held the Canadian Agency for the Eden electric washer, has now returned from overseas and is establishing the Canadian Branch of the Brokaw-Eden Company, with office at Room 202A, 23 Scott Street, Toronto.

Mr. W. H. Stanton has accepted a position with The Ohio Brass Company. Mr. Stanton has been identified with the electric industry for the last twenty years, having started with the General Electric Company and remaining with them for a period covering eighteen years in the testing, engineering and sales departments.

Mr. F. I. Spielman of Spielman Agencies, Regd., Montreal, has been appointed Vice-President of the Canadian Association of British Manufacturers. The object of this Association is to further the interests of British trade and to deal with such matters as tariffs, taxes, freight rates, time limits for tenders, etc.

Mr. F. M. Macauley, manager of construction and operation of the Calgary municipal railway, has been appointed general manager of the New Brunswick Power Company, St. John, New Brunswick.

The City of Sherbrooke, P.Q., proposes to spend $300,000 in the extension of the city electric plant.

Current News and Notes

Belmont, Ont.

This town has asked the Hydro-electric Power Commission of Ontario for a supply of power.

Ameliasburg, Ont.

The Ameliasburg Township Council has passed a motion to request the Hydro-electric Power Commission of Ontario to complete estimates for a radial line from Picton to Trenton.

Edmonton, Alta.

Premier Stewart has announced, according to newspaper report, that an appropriation of more than $4,000,000 for telephone extensions will be asked for at the coming session of the legislature. This is to provide better facilities in the outlying districts of the province.

Gloucester, Ont.

The Council has approved the installation of a hydro-electric system for both light and power. This will involve an expenditure of approximately $100,000. As soon as the approval of the Hydro-electric Commission has been received the construction of the lines will be announced.

Kitchener, Ont.

In order to meet the extraordinary shortage of power, it is said the Kitchener Light Commission have under consideration the installation of an auxiliary plant. A special engineer is to be called in to look over the ground.

London, Ont.

It has been announced by Supt. Williams of the C.P.R. that an automatic electric light system of signals is to be installed this summer on the 125 miles of C.P.R. track between London and Toronto. Altogether, about a quarter million dollars will be spent by the company in improvements in this division during the summer of 1920.

Lucknow, Ont.

A by-law with only two votes cast against it was passed in favor of bringing the Hydro to the village.

Montreal, P. Q.

D'Allaird Manufacturing Co. Ltd. have completed their new factory for the manufacture of blouses, corner Laurier and Clarke Ave. The consulting electrical work, consisting of electric motors and lighting, was carried out by Smart & Burnett, New Birks Bldg.

Consumers Cordage Company, Ltd., have retained Smart & Burnett as consulting engineers for the installation of a new 56 in. vertical waterwheel.

Ottawa, Ont.

A recommendation has been presented to the Council on the motion of Controller Joseph Kent, as a solution to the street railway problem of insufficient service. It is to the effect that the city empower the company to purchase the necessary extra cars, sheds, and equipment with the understanding that the city pay dollar for dollar for this extra equipment when taking over the ownership of the railway.

Peterboro, Ont.

The Canadian General Electric Co. are prepared to expend in Peterboro, on new buildings and equipment between $600,000 and $1,000,000, according to Senator Frederic Nicholls. Work on the new buildings is to commence in June, and will include a moulding shop.

Trenton. Ont.

The Bell Telephone Company are shortly to begin the erection of a modern 'phone building on property purchased by them from Mr. Barton Hoover. This property is situated on Dundas St., Trenton.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 309 Broadway
CHICAGO - - - 1413 Gt. Northern Bldg.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, March 1, 1920 No. 5

Electrical Men of Quebec Province are Co-operating and Organizing

The "get-together" meeting of electrical men held in the Windsor Hotel, Montreal, on Feb. 18 and 19 indicated that the city, and the province of which it is the chief centre, are very wide awake to the value of co-operation in advancing the interests of the electrical industry, or as Goodwin puts it "the great 'job' of electrifying all industry and all the processes of living".

In the matter of organization the province of Quebec has, perhaps, in the past, been a little more conservative than some of her sister provinces but not to the extent that the industry has been retarded. Indeed if comparisons are allowed it may be said that electrical development in that province has been more extensive than in any other part of Canada and the mistake, if any, has merely been that the proper balance between supply and demand has not always been kept sufficiently prominently in mind. That is, for example, that the supply of current has been more than sufficient to meet the needs of commerce. In Ontario the condition is just the reverse,—the demand is for increase of the supply of electric current. What both provinces need, evidently, is merely an adjustment of the balance.

Which province has the easier task—that is, whether it will be easier for the Ontario central station end to catch up with the demand of the merchandising group or for the Quebec merchandising end to catch up with the central station supply—is perhaps open to question. Certain it is that the province of Ontario has a tremendous task in hand to keep pace with the demands for electric current which are daily becoming more urgent as the organization of the dealers proceeds and new stores and better merchandising methods come into being. There is no apparent possibility that the supply in Ontario can be materially increased for, perhaps, two years and one hesitates to predict what will happen to the demand in the meantime if the normal increase continues.

In Quebec, on the contrary, where greater activity in the merchandising end can be made effective in more or less degree almost immediately, the condition of congestion should show improvement as soon as the organization of the contractor-dealers can be brought to yield results. In other words, Quebec has a double reason for organizing, first, the usual advantages following organization, such as elimination of wasteful, destructive competition, insufficient methods of operating, etc., and second, the guarantee that there is a clear field ahead for many years to come in which they can make profitable use of the lessons learned through organization.

There can be little doubt that Mr. Goodwin convinced his Montreal audience, as he had previously convinced Ontario, that his plan for the organization of the industry in Canada is sound, and equitable in the main. His exposition of the plan is of great value to Canadians if for no other reason than that it gives us something to think about, something to set up as a standard of comparisons. As a nation our ideals may not be just the same as the ideals of our neighbors to the south, even in the electrical business, but for the interest he has created, for the splendid ideas he has suggested to us, and for the lines of thought he has set in motion, Electrical Canada, as a whole, is deeply indebted to Mr. W. L. Goodwin and his genial partner, Mr. S. A. Chase.

Frazil and Anchor Ice. Tests and Experiments on Theory of Formation

In order to test his theory of the formation of frazil and anchor ice, Mr. John Murphy, the electrical engineer of the Department of Railways and Canals, Ottawa, carried out a series of experiments in the basement of the Chateau Laurier, Ottawa. The experiments were made by means of water contained in bottles, each bottle containing five gallons. The water was cooled to the critical point—32 deg. F. —and was brought to a room in which the temperature was round about 63 deg. F. The object of the experiments was to demonstrate that frazil ice is caused by the agitation of the water, and that its formation can be prevented by the introduction of a small amount of heat—a 1,000th part of a degree is sufficient, according to Mr. Murphy. Moving pictures of the experiments were taken, and these were shown at the meeting of the Montreal branch of the Engineering Institute of Canada on February 12th. Such pictures, showing the actual process of frazil formation, have never been made before.

The pictures illustrated how the ice was formed by means of the water being agitated by metal rods; the frazil became more dense as the agitation of the water proceeded, the anchor ice falling to the bottom. The frazil gradually accumulated, and in the course of a very short time completely covered the metal rod used for agitating the water.

In order to show the effect of a small amount of heat, two rods were introduced into one of the bottles, in which frazil had formed—one rod was just below freezing point and the other just above. The frazil quickly adhered to the cold rod, while the warmer rod was untouched by the ice.

Mr. Murphy, in explaining the pictures, stated that they illustrated the theory which for fifteen years he had been [illegible] with more or less success. Ice could be prevented from forming very easily, a small amount of heat introduced into the [illegible] was all that was necessary. The heat could be introduced either by driving steam into the [illegible] using electric power, or the example of a cement mill in Illinois could be followed, where the water from a condenser was placed in a river, with the result that no ice was formed for a distance of a mile and three [illegible]. Here the [illegible] warm water was one to 500. Outside the area affected by the warm water, ice formed. But, added Mr. Murphy, it was not necessary to heat the water or melt the ice to prevent frazil—his advice was heat the appartus. Experience led him to believe that the formation of frazil was due to the agitation of the water, and that the difference of 1,000th part of a degree above or below the freezing point made all the difference in the formation of frazil. If the metal parts of the apparatus were a 1,000th part of a degree below the freezing point they would attract the frazil; if they were 1000th part of a degree above the freezing point there would be no trouble. Mr. Murphy also referred in warm terms to the help he received from Prof. Barnes, of McGill University, in his investigations on this question.

The following took part in a brief discussion: Dr. L. King, Messrs. E. S. M. Lovelace, G. S. Gale (Ottawa), J. A. Burnett, E. A. Evans, (Quebec), and Mr. Hunter.

In replying, Mr. Murphy said he believed that ice could be prevented forming on the St. Lawrence by a reasonable amount of expenditure. The subject of frazil was of such serious importance to hydro-electric plants that it should be taken up either by the universities or by the Council for Industrial Research.

Water Power Situation on Pacific Coast — Electro-Chemical Industries

The "Daily Province" of Vancouver prints details of an extensive interview with Mr. Arthur V. White, Consulting Engineer to the Commission of Conservation, regarding the general water power situation in British Columbia. The item points to the very advantageous situation of that province in the matter of ample supply and emphasizes at the same time that it is largely due to the three largest companies that the industrial development of the Coast and boundary districts has been possible. Mr. White also once more reiterates the impossibility of electricity ever taking the place of coal as a general heating agent pointing out that if all our twenty million horsepower in waterpowers were developed there would not be enough to heat our population of to-day to say nothing of the future when Canada may number many times its present population. On the question of electro-chemical industries, to which we may expect many of our farthest north waterpowers will be applied in the near future, Mr. White is quoted as follows:

The electro-chemical industries which, under the inducement of large blocks of cheap power, located in populous districts of the East, have of late years been finding that they are being compelled to go farther and farther afield for hydro-electric power, because other markers have now been created for using all power at rates far in excess of what many electro-chemical industries can afford to pay. This is an aspect of power utilization into which government administrators should carefully look after granting power concessions which, in the near future, may be found to be better employed for upbuilding communities deriving their existence from a large number of highly-specialized manufacturing establishments utilizing the provincial natural resources.

[illegible] that British Columbia has many natural products, which for the time being, in order to be marketed at all, have had to be shipped with practically a minimum amount of labor bestowed upon them. It must be held in mind, however, that this is not the way in which to build up the province. The basic doctrine upon which to operate should be that every natural resource of British Columbia should have bestowed upon it, not a minimum, but a maximum amount of skilled labor in order that the people resident in this province will receive not only the profit on the natural resource itself, but also the added remuneration for, and even the profit upon, their own skilled labors.

"British Columbia could not have a better advertisement in the world at large than have it known that capital could enter this province and upon embarking in legitimate development of natural resources, could show a good, reasonable profit upon the investment; indeed one can hardly conceive of any single feature that would contribute more to the rapid opening up of new development than the knowledge that investment in British Columbia would, under proper handling, prove commercially profitable."

Encouraging Advances in Wireless Telephony

A great point about the wireless telephone is the absence of the distraction found in the ordinary telephone; sound is sharp and short. Wireless telephony is particularly suitable for use in connection with airships and aeroplanes, and it has been adopted by the London-Paris aeroplane service as the regular means of communication. Radiotelephonic speech can now be maintained from an aeroplane with stations on land 150 miles away, and miniature telephone exchanges can now be established on aeroplanes so that they can speak to each other as well as to land stations.

Many important developments in wireless which were first applied to war purposes are now being adapted to general commercial use, with the result that present day practice in wireless telegraphy and telephony shows a great advance on that of pre-war days.

The more general use of continuous or undamped waves in the place of the damped waves associated with spark equipment, has resulted in the production of apparatus having a considerably increased radius in relation to power employed, and a greater immunity from interference. By the development of the size and power of thermionic valves as generators of continuous waves, commercial wireless telephony can now be effective over a guaranteed range of 150 miles, this range being half the maximum obtainable in favorable circumstances; this with portable equipment. The same sets when employed for purposes of telegraphy have a guaranteed range of 400 miles. For fixed stations valve transmitting sets are being produced, giving a guaranteed range for commercial working of over 1,000 miles.

By the employment of these new methods of transmission and reception, the establishment of wireless communication can be accomplished at very reasonable cost over districts unsuitable for cable work or where traffic would not justify the great capital outlay necessitated by cable installations.

Amongst other wireless devices to which the Marconi company are paying close attention are wireless direction finders for use in the marine and aerial services, and a calling device which obviates the necessity for continuous attendance at the receiver. The calling device enables a ship in distress to attract through the ringing of a bell the attention of other ships in range even although the operators on board those ships are not actually on duty.

Annual Statement of Committee on Waters and Water-Powers, of Commission of Conservation

By Mr. L. G. Denis

In addition to the kind of motive power with which it is more directly conserved, namely, water-power, your committee on Waters and Water-powers is also interested in others such as steam, gas, oils etc., for the purpose of comparison with water-power in such matters as cost, desirability and possibilities. With this in view and further prompted by the close connection which water-power has with electricity, your Committee began an investigation on the production of electrical energy throughout the Dominion whether derived from water-power, steam, or other modes of primary power, this resulting in our report on "Electric Generation and Distribution in Canada." This report, which was published and distributed during the year, has been well received and seems to fill a long felt want, being the first publication to cover the subject for Canada in a complete and detailed manner. In view of the important place taken by hydro-electric energy in the various expansions of the country, it seems desirable to have adequate data both as to the supply, distribution, demand and rates in connection with electrical energy in the various communities of the Dominion. The intimate relationship between electrical energy and water-power is now a well established fact and the above mentioned report demonstrates that this is particularly applicable in Canada; of the total central electric station capacity, over 85 per cent. is installed in water-power plants and less than 14 per cent. in steam plants. Nor do these figures sufficiently accentuate the predominance of hydro-electric energy in the actual supply of the country's needs as a large number of steam plants are only installed for auxiliary or emergency purposes and some years may not be used at all. It is of interest to note the large size of our hydro-electric plants; 41 per cent. of the total installation is in plants of 100,000 h.p. or over while another 43 per cent. is in plants of between 10,000 h.p. and 100,000 h.p. leaving only 16 per cent. in plants of under 10,000 h.p. capacity.

The rapid strides previously recorded in this connection are attaining even greater proportions, this being fully demonstrated by recent progress in hydro-electric installations actually completed and placed in operation, as well as in the developments at present in construction and others definitely contemplated for the near future. During the past year the installation of a total of 64,000 h.p. was completed in various portions of the Dominion; the various developments at present under construction or in process of installation aggregate over 370,000 h.p., while other projects and expansions definitely contemplated for the near future will add some 750,000 h.p.

The salient feature in this present expansion is the stupendous undertaking in connection with the Ontario Hydro-Electric Power Commission's development at Niagara Falls, the construction of this being at present about one-half completed. While the initial installation for this Chippawa development is to be around 200,000 h.p., expansions to 500,000 h.p. are contemplated in the not far distant future. In addition to the large amount of power involved the development is also remarkable as being designed to use the greatest possible head available for Niagara power, namely 316 ft. as compared with heads varying from 64 ft. to 180 ft. at the other Niagara plants.

Another item worthy of note in regard to Canada's water-power expansions is the impetus given by the progressive policy of the Quebec Government in facilitating and encouraging conservation water storage. This has been put into actual practice on a number of streams while projects for a number of others are either under construction or definitely contemplated. As a direct result of this a number of plants have been able to increase their output and new plants have been installed. As an instance, it has recently been stated in connection with the Gouin Government reservoir on the St. Maurice river that the capacity of the Shawinigan and Grand'Mere plants is soon to be raised from the present 330,000 h.p. to some 600,000 h.p.

This rapid progress reflects a great deal of credit on the Dominion and should be encouraged in every rational manner while at the same time it should be mort carefully guided. One of the questions suggested by this prosperous condition is, how long will we be able to carry it on. According to a recent statement based on United States official figures, the electrical installations in that country have doubled every five years during the past generation. In Canada the growth of hydro-electric development has been almost as spectacular, the present installation being over ten times that of 1900. The present hydraulic installation in the Dominion has nearly reached 2,400,000 h.p., and even if we assume only half the rate above mentioned for the United States, or in other words, that our present installation would double every ten years, a total of 4,800,000 h.p. would be reached in ten years, 9,600,000 h.p. in 20 years and 19,200,000 h.p. in thirty years.

The following table shows the estimated developed and undeveloped water-power in Canada, an attempt being made at separating the available sites within the populated areas from those farther north.

Developed and Undeveloped Water Powers in Canada

Province or District	Estimate Total Possible h.p.†	Estimated Possible in Populated area h.p.†	Total Developed h.p.†	Available in Populated area h.p.†
Quebec..	6,000,000*	3,500,000	900,000	2,600,000
Ontario	5,800,000	3,800,000	1,000,000	2,800,000
British Columbia ...	3,000,000	1,300,000	310,000	990,000
Manitoba	2,797,000	597,000	78,600	518,400
Alberta.	462,000	106,000	32,500	73,500
New Brunswick. ...	300,000	300,000	17,000	283,000
Saskatchewan	220,000	62,000	40	61,960
Nova Scotia	100,000	100,000	30,000	70,000
Yukon..	100,000	13,400‡	13,400	.....‡
Northwest Territories	50,000			
Prince Edward Island	3,000	3,000	1,700	1,300
Total..	18,832,000	9,781,400	2,383,240	7,398,160

†Minimum all year power, with possible regulated flow where investigated. Figures for some of the rivers included may vary as additional information is secured from future detailed surveys, flow records and conservation storage investigations.

*Not including Ungava. 5,000,000 h.p. south of the 50th parallel.

‡Available possibilities not definitely known.

We thus see that while our northern water-powers are yet untapped, there remains an aggregate of less than 7,400,000 h.p. within our populated areas. It may be added that this is by no means based on conservative estimates; full diversion and the greatest head possible at Niagara have been assumed and full regulated flow has been taken on rivers where conservation reservoirs are actually being utilized or where estimates have been made of such possibilities.

If we further analyze the situation within the populated portion, we find Ontario's share mainly confined to, (1) The St. Lawrence, (2) What remains of Niagara, (3) One-half of the Ottawa river powers. Correspondingly, Quebec's share may be brought down to (1) The St. Lawrence, (2) One-half of the Ottawa river powers, (3) What remains of the St. Maurice river, (4) The Saguenay and tributaries, much of the latter being in yet unsettled territory. In British Columbia the available power is largely centred around Nelson and Vancouver where some 400,000 h.p. and 300,000 h.p. respectively are reported within a radius of 50 miles from each place.

Among other work to which your Committee has devoted attention during the past year may be mentioned such subjects as aluminium and its use in electric energy transmission, water-power in Alberta, long distance electric transmission lines, the nitrogen industry and Canadian water-powers on each of which comprehensive reports were prepared. Other investigations and reports include the power used in Canada and the United States, power required in pulp mills, government conservation storage, electric supply for Southern Saskatchewan, effect of tributary storage on Lake Superior level, while numerous answers were sent on request solving other particular problems of local interest in various portions of Canada.

Your Committee has also recently initiated an investigation covering certain features, facilities and obstacles in the operation of water-power developments with the object of promoting a fuller and more beneficial utilization of our hydraulic resources. In this connection particular attention is given to Canadian problems such as ice troubles and conservation storage. It is intended to spread this information for the benefit of those facing such problems and thus encourage a greater and more efficient use of our water-powers. A number of requests elicited by our own request for the information in this connection have already been received from power users asking how certain difficulties are solved elsewhere.

Another subject requiring attention is suggested by the number of requests for up-to-date information on developed and undeveloped water powers in various portions of Canada. For Eastern Canada our report of 1911 is the only one thus far published covering the ground in a detailed and thorough manner, but as exploratory surveys, stream flow measurement and other cognate work have been carried out since, and on the other hand a number of water power developments have been completed, the tabular matter of our 1911 report requires to be brought up to date.

Among other future work may also be mentioned the collecting and co-ordinating of available stream flow and water level data and the investigation of a possible more adequate supply of electric energy in certain portions of the Dominion.

Economy of Electric Drive in Ships

A comparison of performance of the motive power of the "New Mexico" with that of other battleships shows marked economy in favor of the electric drive. Thus at 12 knots' speed the consumption in tons of oil per day was, for the "New Mexico" (electric drive) 75 tons, as compared with the "Arizona" for her cruising turbines 100 tons, and main turbines 118, and for the "Mississippi" for her cruising turbines, 99 tons, and for her main turbines, 115 tons of oil per day. At 19 knots, the consumption of the "New Mexico" was 263 tons, of the "Mississippi" main turbines 305 tons, and of the "Idaho" main turbines, 310 tons per day.

The Ohio Brass Company are distributing a little folder on the O-B car equipment specialties for use on one-man, safety cars; illustrated.

The Modern Purchasing Agent

By Mr. Wilfred G. Astle

The statement has been made that, in the last analysis, there are only two members in the business family—buying and selling. If this is true, then buying should hold one of the major positions in the business world, whereas it is not infrequently supposed to hold a position much further down the line. Under the old method of doing business, the purchasing agent used to be considered a fellow who kept a scrubby book—with a lot of quotations in it—and everytime a requisition came from the factory, he had simply to look into the book, find out the name of the concern who manufactured the particular article, look up a previous quotation or a previous order and invoice and place his order for so many hundred of the article. In some cases he would write a cold withering inquiry requesting the lowest price and best delivery. Not much head required for this work, but then, this class of man never was a purchasing agent—he was merely a quotation clerk.

What do we require of the real purchasing agent today? In the first place he must assume a constructive position in any well managed concern. It is up to him to study the market, to have world movements of all the basic commodities at his finger tips. This is the only way that he can judge the outcome of commercial conditions.

Buying is fast becoming a profession, and we find that many of the cities are rapidly employing their own purchasing agents, instead of placing their orders for supplies and materials through that series of channels, which have been time and again demonstrated as costly and prohibitive. We know that selling is an important function in the modern business organization, then why is not buying? ,

Getting Service from the Seller

Keeping the amount of stock on hand down as near as possible to the minimum, but still keeping it above the danger line, is a condition that all purchasing agents strive for. It is a most desirable condition, but before it can be done, with any degree of success, one must be able to get the very best service from the seller. This means—have the deliveries come in at just the right time. Every buyer has certain firms on his list—concerns that he knows when he places an order for some particular article, that there is someone in that firm who will follow it up and see that shipment is made as requested. A dependable source of supply is one of the most important assets of a purchasing agent, but to build up such a list of supplies, he must do his part. He must know the approximate time required to manufacture the article he is buying. This is gained, mostly by experience, coupled with the knowledge as to whether conditions are normal, or otherwise, in that particular industry.

By keeping in close touch with the market conditions, the buyer can avoid causing the seller to feel that he has received an unreasonable request for shipment. It is always best, as far as possible, to anticipate requirements, which results in much better service. It is very bad policy to mark all orders "Rush" or "Urgently Needed", for the reason that they will lose their effective punch. When orders are placed regularly with a concern, you certainly have a right to expect satisfactory service, and as a general rule you will always get it, especially when it is known that you appreciate what is being done for you. Therefore, a buyer will find it to his advantage to always grasp every opportunity to express appreciation of any special service that the supplier may give him. This will please the seller, and it also marks the buyer as being an up-to-date wide-awake man.

It stands to reason, that when a seller knows, through previous experience with a buyer, that he will not urge quicker delivery when it is not really required, he is certainly going to give more serious attenton to that buyers hurry-up letters, long distance telephone calls, telegrams, and personal visits.

Knowing What and How Much to Buy

This is one of the most essential elements necessary when placing an order, because it is a well known fact, that the most failures in business are the result of buying too much material at high prices. The tendency, under the unusual conditions prevailing during the period of the great world war was, in a great many lines, to disregard the maximum stock limits and get whatever materials could be secured. However, the fundamental principles of right buying, that is, keeping within the limits, securing quality and service with a reasonable price, were, in spite of the extraordinary conditions which prevailed at that time, more clearly emphasized than ever.

To determine what, and how much to buy, the purchasing agent must be familiar with previous purchases, sales quotas, and current consumption, therefore,, in order to exercise his art of buying to the greatest perfection, it is absolutely necessary that he have this data and information available for easy and quick reference. Records of previous purchases are very necessary to the successful modern buyer, because if these are kept up in good shape, he knows that the people he has asked for puotations are the best in the country to furnish him with what he wants—that they will furnish him with the kind of service that will cut down costs, and save a lot of irritation. He knows, also, that these concerns are in the best position to quote him favorable prices, and that they have proved reliable in furnishing the quality required. Such records as these will also help the buyer to steer clear of once-paid-for mistakes.

The modern buyer helps himself in this way; he keeps in touch with all possible sources of supply, and knows intimately the capacity and character of all the different suppliers' warehouses and factories. He does a great deal, too, in the way of collecting and developing such reliable information, by the friendly cultivation of the salesmen. He also keeps, and regularly consults a file of catalogues and price lists.

Knowledge of Current Consumption

This is a great factor in figuring how much to buy, and is basically a stock-keeping problem, the most important part of which, is the perpetual stock record system. There are a great many instances where the purchasing agent cannot buy for the future on the basis of past consumption, nevertheless, such records of the quantities consumed over a given period, are very valuable in determining how much to buy, and when materials are bought ahead of requirements, a record of past consumption will enable the buyer to schedule shipments to closely conform to consumption demands.

In addition to the record of past consumption, the purchasing agent should keep in close touch with the sales manager of his firm, because there is a very definite, and vital relationship, between the two departments. For instance, the aim of the purchasing agent is to buy when the market is low, therefore, he is often forced to place his orders several months in advance of requirements, and to provide intelligently for such basic requirements, it is very necessary that he have an estimate of sales for the coming period.

To buy when the market is low, is, we all agree, a basic principle, but, to buy at inopportune times, or in excess of requirements, is very liable to cause severe losses, unless there are some compensating advantages in the matter of price. There are many things to consider when buying, in excess of requirements, and on a low market, and some of these are as follows:

Is the material to be used at once?

Is early delivery insisted upon by the seller?

Will the interest charge on the investment outweigh the lower price secured?

What is the cost of the space for storage of the material?

What is the possible depreciation in the material?

Is there a possibility of the price going still lower?

All these considerations are carefully weighed by the modern purchasing agent, who has his eye fixed, not on savings in first cost, but on the final cost economy. Any accumulation of materials, beyond what is required to keep the business moving along, means that certain losses are incurred, which are:

Depreciation.
Insurance.
Value of space occupied.
Obsolescence.
Interest on money invested.

Forecasting Future Trend of Prices

This is one of the greatest problems that face the progressive purchasing agent. How is he to know when prices will move from one period in the cycle of trade to the other? He must study the state of business, the political situation, the crops, and the supply of banking funds.

Men of the ability necessary to fill the position of purchasing, in these days of strenuous competition, are very apt to get impatient at the system and routine, which is necessary to fill the position efficiently. If the system, however, is properly designed, it will act as an aid, and not a hindrance, to the exercise of special abilities. A proper system will reduce the details of the position down to matters of rountine, and will relieve the purchasing agent to that extent, making it possible for him to devote all his energy and ability to those matters which cannot be so reduced. One should always remember, that the biggest problems in life cannot be systemized; but in systemizing the smaller problems, it leaves real personalities free to handle the larger ones.

Benjamin Electric Open Montreal Office

The Benjamin Electric Company, of Canada, Ltd., Toronto, have opened a new office in Montreal, at 243 Beaver Hall Hill, from which Quebec province and the East will in future, be given a prompt service such as was scarcely possible with all business centering in Toronto. The office will be in charge of Capt. Reg. T. Smith, who has been with the company since last September when he returned from overseas.

The Farmers' Telephone Company of Howick Station, Quebec, has been recently incorporated to erect, develop and operate a telephone service in the rural districts near Montreal. The main line will start from Howick, Quebec, and extend west to Howick Junction, Brysons, Ormstown, Dewittville, Huntingdon, Clydes Corners, Tees' Corners, Dundee Centre and Dundee. It will extend east from Howick to Ste Martine, Chateauguay, and Chateauguay Basin. Three branch lines will also be run one commencing at Dundee, one at Howick and the other at Ormstown.

Squamish Hydro-electric Power and Water Supply Development

History of the Project and Construction Details by J. B. Holdcroft, A.M.E.I.C., Designing Engineer and Engineer in Charge

The town of Squamish, B.C., while at present little more than a village in population, is the southern terminal of the Pacific Great Eastern Railway, and the site of the company's repair shops. The town is very pleasantly situated at the head of Howe Sound, and gives a promise of becoming, if not a large city, at any rate a very prosperous industrial town as the various local natural resources are opened up. The southern end of the railway, of which Squamish is the logical outlet to salt water, is very richly endowed by nature, and should develop along agricultural lines to a large extent, as well as profit tremendously from the almost illimitable supplies of timber available close at hand, while the mineral possibilities have hardly been exploited for even explored, as yet, but are known to be very great.

The town is, very naturally, the home of a great number of the railway employees, and it was this fact, coupled with the necessity of finding an economical source of power for the repair shops, that in 1913 induced the then directors of the company to commence the development of a hydro-electric power plant to produce 500 horse-power from the waters of Monmouth Creek, a stream three miles west of Squamish and across the Squamish River. Plans were completed, the machinery and pipe for the penstock were purchased and delivered on the site of the work, and construction was on the point of commencing, when orders were suddenly issued by the directors of the company to discontinue the work indefinitely.

The supply of water for domestic purposes in the town was not contemplated under this project, for the reason that the Newport Water Company had obtained a license to divert and use for domestic purposes three second feet of water from the Stawamus River, a stream east of the town, undertaking to install suitable head works, a pipe-line and distributing system to give a good supply of water to the town. This company laid a distribution system of sorts, but had installed temporary headworks on a small stream, a branch of the main Stawamus River, pumping a more or less inadequate supply from this point to a 5,000 gallon tank situated on top of a saddle-back about 175 feet above the town. This supply was most unsatisfactory, and gave a lot of trouble, owing to the engine or pump breaking down frequently at awkward times, but the company never made any move to complete the original project, probably on account of financial difficulties. Later on, during the business depression immediately preceding and during the war, the water company gave up even trying to operate the system as it stood, and put it up to the residents to run the system themselves as best they could, charging them only a nominal rental.

This situation resulted in many public meetings and much heart-burning, but after several plans had been tried out and found impracticable for various reasons, Mr. Wallace Kennedy, a well-known resident of Squamish, agreed to take over and operate the plant as it stood, undertaking to pay the rentals and reimburse himself out of water rates which were then agree upon. The duties thus taken over proved onerous beyond all expectations, with the profits not by any means commensurate with the trouble involved, and much credit is due to Mr Kennedy for the public spirit displayed in sticking to the work through increasing difficulties until the gravity supply was at last available.

Even under this arrangement, however, the supply was necessarily so uncertain and spasmodic that as soon as the Provincial Government had taken over the management of the Pacific Great Eastern Railway system, the residents of the town started a campaign to have the government either force the water company to complete their project, or itself, through the railway company, install the system. These representations finally resulted in the purchase, by the railway company, of all the property of the water company for the cost of actual construction, without any allowances for repairs or interest, while "good-will" was naturally non-existent under the circumstances.

Surveys and investigations were immediately undertaken to determine on the best method of utilizing and improving the property thus acquired, and it was finally decided to apply for the record of additional water on the Stawamus River, and make the plant a combined water-supply and power plant, utilizing the machinery which had been purchased several years before for the development at Monmouth Creek. Thus would be gained the advantage of a self-contained plant which would give an adequate supply of gravity water for the town and the use of the railroad shops, while electric current could be generated to the extent of a maximum of about 270 horse-power within a reasonable limit of expenditure. This plan contemplated using all of the pipe and machinery purchased for the original Monmouth Creek plan with the exception, of course, of the water-wheel itself, which would have to be changed to meet the new hydraulic conditions.

Designs were now drawn up on these lines. The selection of all equipment was done with an eye, as far as possible, to keeping the expenditure within the Province, as well as keeping it as low as possible. With this in view the dam was to be constructed of crib-work from timber cut near the site, and the main portion of the pipe-line of wood stave pipe manufactured in Vancouver.

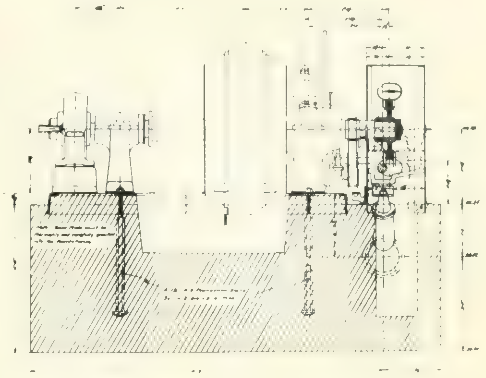
Three second feet of water were already recorded by the Newport Water Company for domestic purposes, and the conditional license for their works became the property of the Railway Company with their other assets. Seven second feet more, for power purposes, were applied for, and as the working head for the sizes of pipe chosen was calculated to be 350 feet, the horse-power available would be about 223. It wsa considered probable, however, that for a considerable time to come the entire quantity of water reserved for domestic purposes would not be required, and that one second foot would much more than cover the maximum demand. It was therefore decided to arrange the unit so as to be able to use two additional second feet of water for power, with only minor alteration, in which case the delivery of power would be in the neighborhood of 270 h.p., as stated above.

The total length of pipe line is 10,900 feet, and the total head is 420 feet. Storage is not possible, as far as has been ascertained though the stream has not been explored with this in view for a greater distance than 6 miles above the site of the dam. The low water flow was taken as 8 second feet from observations made by Messrs. Cleveland and Cameron, who were consulting engineers for the Newport Water Company when the original waterworks were in progress. During the twelve months in which the present engineers have been engaged on the work no flow as low as this has been noticed, though, owing to the pressure of the work no proper measurements have been taken, and only rough estimating methods have been used in judging of the river's actual flow. The maximum flood or freshet flow was estimated, from a study of such data as were available, to be 4,000 second feet, and spillway room was provided for this flow. This calculation was proved to be substantially correct since the dam has been completed. The structure has successfully withstood two heavy floods, the second of which was accompanied by considerable quantities of broken ice. The spillway proved to be of ample size without being too large, and no damage was done to any part of the structure.

Design

The type of construction chosen for the dam, as stated above, was timber crib, as regards most of its length, including the spillway, but a section of 56 feet is of "log-wall," backed by a slope of heavy boulders laid in concrete. It was sited about 175 feet further up-stream than the site chosen by the Newport Water Company, for the sake of using a small island in the centre of the river as a central buttress for the structure. It was also considered necessary to provide ample spillway room on account of the extreme flood conditions expected, as stated above, which fact also had weight in the selection of the site. The spill-way was made 60 feet long and at an elevation of 7 feet below the crest of the main dam. It was calculated that an extreme flood would cause a flow of 4 feet over this spillway, which calculation was proved substantially correct when a very sudden and heavy flood occurred in the latter part of November, 1919. This was the first of the two floods mentioned in the preceding paragraph. The second flood raised the water about 6 feet in the pool above the dam, but though this flood occurred in the night, and was not observed by any of the employees of the plant, it is believed that a jam of ice formed just upsteam of the spillway, thus raising the water, and that the abnormal rise was not due solely to the quantity of water flowing at the time.

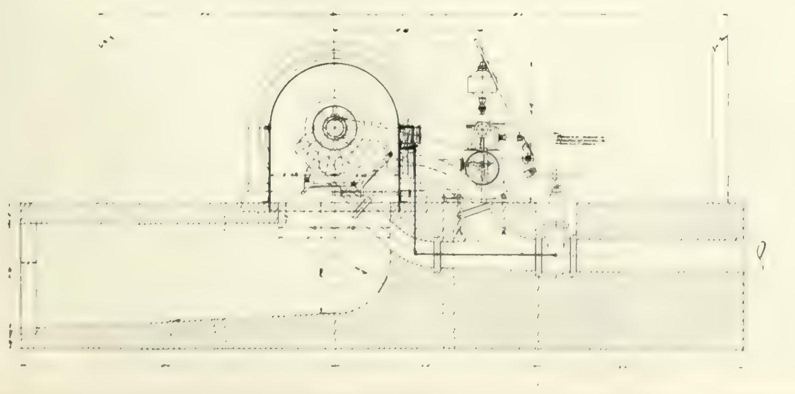
The forebay, which is a simple wooden tank, 8 ft. x 8 ft. x 24 ft., is located about 500 feet down stream from the dam, and is built on a bench of rock about 30 feet above the river, so that it is absolutely safe from any conditions of flood that may arise. Connection from the dam to forebay is made with 20 in. wood stave pipe, laid with a total difference of elevation between the two ends of 6 inches. The working head, however, is three feet or over, as the overflow of the forebay is set three feet lower than the crest of the spillway at the dam.



Section of turbine and generator, Squamish, B.C.

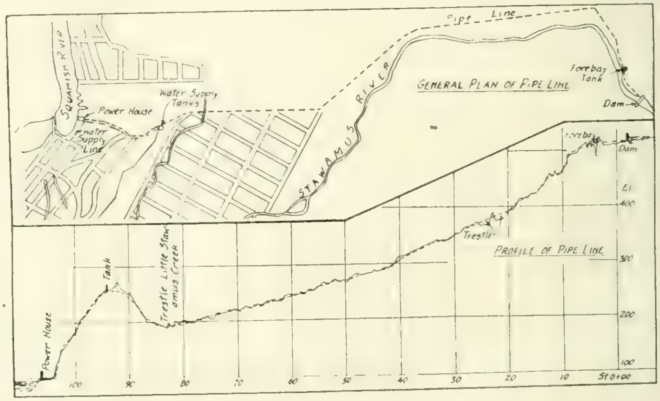
The flow is controlled by a 20 in. gate-valve set at the up-stream end of the forebay, while the intake chamber at the dam is also provided with a square wooden gate operated by a hand-wheel and screw and the pipe-line is protected from the entrance of large pieces of foreign matter by a wooden rack screen set over the end of the pipe. At the outlet of the forebay another screen is provided, cylindrical in shape, built up of light angle iron sections and covered with wire cloth with one-half inch meshes. Troble was experienced during flood periods with leaves and other debris getting through the rack screen and accumulating on the wire screen in the forebay. This occurred to such an extent that the wire screen eventually partially collapsed, and a repetition of the occurrence will be prevented by installing additional flat wire screens which can be easily raised for cleaning without exposing the end of the pipe.

From this point on to the tanks which were installed



Section showing penstock, governor, waterwheel and discharge arrangement, Squamish Hydro-electric plant as distributing reservoirs for the domestic and fire protection supply, the water is carried in wood stave pipe of the factory-made type, the sizes varying from 20 in. at the forebay to 16 in. at the tanks, the size varying by 2 in. at each change. Joints were made by means of wood stave sleeves fitted with from 2 to 5 round iron hoops of the type used for continuous stave pipe, according to the pressure at each particular location. The highest static head on any portion of the wood stave pipe is 320 feet. At the tanks, as above noted, the construction changes to steel pipe, using the pipe which was manufactured for the Monmouth Creek project which was 14 in. in diameter, partly fitted with hub and spigot joints and in the lower section, with bolted flange joints. Practically no trouble has been experienced with the pipe. No serious leaks have developed, with the exception of a blow-out which occurred at a bend. In this case the ground had become very much softened by long continued rain and, the weight of the concrete anchor alone proved insufficient to hold the work together. This was repaired in a few hours, however, and service resumed with scarcely any interruption.

The power house is a simple frame structure, 20 ft. x 24 ft., but well built, as is of course necessary for housing the electrical machinery. It was found necessary to drive piles to support both the building and machinery, as it is located on the bank of the river on a silt and sand deposit and it was feared that the vibration would cause trouble.



Plan and profile of water pipe system, Squamish hydro-electric and water supply system. Total head 420 feet; length of pipe 10,900 ft.

The generator is a Canadian General Electric 3 phase, 60 cycle, alternating current dynamo, designed for 400 kilowatt output at 4,200 volts. The water-weel is direct connected (single overhung), and is governed by a Pelton type oil pressure governing machine. The hydraulic conditions being entirely different from the original scheme, it was necessary to change the water-wheel runner. Offers were received from the Pelton Company and from the McKinnon Waterwheel and Power Company for making the changes; the latter being a British Columbia concern as well as showing a considerable advantage in price over the Pelton offer, the work was handed to the local firm. This may be said to be the first special wheel of this or any type to be manufactured in the province and it has proved most satisfactory during the trials, only a few minor alterations and adjustments requiring to be made. The designs and detail drawings for this wheel, with its governing mechanism (of the deflecting type) were made by the writer.

The penstock anchorage, generator foundation and the first section of the tailrace are made monolithic in concrete, a small amount of reinforcing steel being used. On leaving the power house, the tail-race construction changes to a simple timber flume to the river bank, a distance of about 70 feet. This part of the structure is reinforced by timber brackets with outside bracing, and is weighted down with stones and earth, a precaution made necessary by the fact that at high tides, when the river is in flood, the water rises almost to the wall of the power house, and would otherwise lift the flume out of its place—which actually happened once during construction.

The high tension distribution system consists of No. 6 hard drawn copper wire, and leaves the power house in two three-phase circuits arranged in equilateral triangles. One circuit branches off at the railway crossing and follows the track to the railway shops, where a pole substation is located, consisting for the present of two 30 kw. transformers from 4000 to 220 volts for the motors and one 5 kw. transformer from 4000 to 110 volts for the lighting system.

The other circuit goes on into the town and supplies current for the street lighting system, as well as for private consumers and lighting the company's office and dock. Two 5 kw. transformers and two of 3 kw. are provided for this purpose, and another of 3 kw. capacity is installed at the end of the railway dock to care for the lighting needs there. It is expected that another of 10 kw. capacity will be required at this point before long to supply power for operating a new transfer slip which is proposed to be erected there. All wires with the exception of telephone wires are covered with w.p. braid insulation inside the town limits. Secondary mains are of No. 2 soft-drawn copper wire.

A telephone system has been installed in connection with the power house, with instruments at the railway offices in town, at the shops, and at the power house itself. All practicable precautions have been taken to prevent injury to the system or to persons from contact high tension wires. Lightning arrestors have been provided on both power and telephone circuits, and emergency cut-outs are installed on each power wire leaving the generating station.

The largest single item included in the improvements to the water system taken separately, was the laying of an 8 in. main to the railway shops for fire protection and general water-supply purposes. The headworks were much improved also. The temporary system installed by the Newport Water Company included a 5,000 gallon wooden tank, intended as a balancing reservoir. The pumped supply described above, however, was so meagre that water was only available intermittently, and sometimes failed altogether for hours at a time.

A tank of 25,000 gallons' capacity was, therefore, added to the existing tank, while the latter was raised to bring its water surface to the same height as the larger one. Supply was then arranged for from the power penstock, a 6 in. riser being put in from the main to each tank, controlled in the first instance by gate valves, and at the tanks, for normal operating conditions, by automatic float valves. The two tanks were then so connected on the discharge side that either tank could be retained in service while the other was being emptied for cleaning or repairs, although under normal conditions the two tanks are operated as a unit. This arrangement has been found to meet all requirements very satisfactorily, and no complaints of shortage of water have been received since the completion of the work. It was found absolutely necessary, however, to provide some kind of a supply from the earliest possible moment during the construction period as the pumped supply was on the point of giving out altogether, owing to the iminence of a complete breakdown of the pump and engine. A temporary connection was made therefore as soon as the penstock reached the point where the new tank was to be located. The end of the pipe was temporarily plugged, and an ordinary hose connection (2-1/2 in.) was inserted with a short length of hose attached which was led into the disconnected end of the old 10 in. water supply main to the town. This service was maintained thereafter, with scarcely a break until the tanks were properly connected up and ready to put into regular service.

All the formalities incident to obtaining the water licenses were also carried out and completed during the progress of the work, while tentative plans were also made for the organization of the operating system. The plant commenced its existence as an operating public utility on December 15th, 1919, with a list of about 80 subscribers for water and about 25 connections made for electric light service, in addition to the power and water connections at the railroad shops. These connections are being added to at the present time as fast as the work can be done, and it is estimated that the present business will more than take care of the operating expenses, while if the entire output can be disposed of at power rates the revenue will not only pay all financial charges, but provide a very satisfactory dividend as well. This is the more satisfactory as the plant was not designed primarily with a view to profit-making, and would have been satisfactory if it would only be barely self-supporting as regards revenue on account of the indirect advantages accruing which can hardly be estimated in terms of money.

Statement of Capital Expenditure

Construction & equipment of buildings, fixtures & grounds	$ 2,706.61	
Hydraulic Power Works	68,314.86	
Hydraulic Power Plant	1,606.20	
Distribution System (Electric)	11,114.40	
Waterworks System	20,380.07	
General Expenses	9,125.41	
January payments (not distributed)	15,349.96	
		$128,597.51
Accounts outstanding, Jan. 21, 1920		
Robertson & Partners	3,375.10	
McKinnon Water Wheel & Power Company	623.85	
Vancouver Engineering Works	26.15	
		4,025.10
Total cost of Development		$132,622.61
Plus increased Capitalization to supply a town of 300 houses.		
Electric Distribution, estimated	3,000.00	
Water Distribution, estimated	5,000.00	8,000.00
		$140,622.61

Statement of Fixed and Operating Charges (Estimated)

Fixed Chaages		
Twenty year life.		
Total cost of plant as at date, Jan. 21st, 1920, $132,622.61.		
Interest on capital of $140,000.00 at 5½%	$ 7,709.00	
Sinking fund on capital of $140,000.00 (20 years) at 6%	3,805.20	
Replacement or renewal fund.		
Note—it is not considered advisable to include a fund for entire renewal at end of life, or for perpetual maintenance, as it is assumed that the development in its present form will become obsolete at the end of assumed life of 20 years.		
Maintenance and repairs, 1% per annum	1,400.00	
		$ 12,905.20
Operating Charges		
Salaries and wages, estimated	12,240.00	
Supplies	600.00	
Taxes		
Water License	113.50	
		12,953.50
Total estimated yearly charges		$ 25,858.70

Statement of Annual Revenue (Estimated)

Electric		
Connected Load, Jan. 21st, 1920		
38 house and store services at estimated average $3.00	$ 1,368.00	
Railway Co. shops, station, wharf, etc., 5 kw. lighting load, estimated	1,530.00	
Railway Co. power load, 45 kw.	7,974.00	
		$ 10,872.00
Rest. 130 kw. at power rate (2c) figured on 10 hour load.	9,442.50	
Plus nominal overload capacity for power 50%	4,721.25	
Plus power available for lighting at night, say 200 houses at $2.00 monthly (unsaleable at present)	4,800.00	
		18,963.75
		$29,835.75
Water		
Connected		
Estimated, 80 house connections at average of $1.25 monthly	1,200.00	
Railway shops at $200.00 monthly	2,400.00	
Two industries at average of $50.00 monthly	1,200.00	
		4,800.00
Future		
Estimated 200 houses at $1.25 monthly	3,000.00	
Estimated 5 industries at average of $50.00	3,000.00	
(Unsaleable at present)		6,000.00
Grand Total of estimated possible revenue		$ 40,635.75

Personnel

Owners—Pacific Great Eastern Railway.

Chief Engineer—A. F. Proctor.

Engineer in Charge—J. B. Holdcroft.

Resident Engineer—G. T. Livingstone.

General Contractors—Robertson and Partners.

Sub Contractors—C. H. E. Williams, electrical installation.; Gordon and Walker, consrtuction of dam and clearing; Cox and Verge, pipe laying and excavation; Pacific Coast Pipe Co., supply of wood stave pipe.

Montreal Convention a Big Success

Splendid Spirit of Co-operation Evident on all Sides—Representative Committee Will Investigate Advisability of Forming Permanent Association Embracing all Elements in the Industry—Also a Contractor-Dealers' Association on a More Comprehensive Scale

The Montreal convention of electrical men, with W. L. Goodwin and S. A. Chase as the central figures, turned out a splendid success. The attendance was undoubtedly reduced to a very considerable extent by the epidemic of influenza, but, fortunately, this had no apparent effect on the enthusiasm of those who remained.

Every section of the industry was represented on the program and, in turn, Mr. Goodwin and his running mate discussed the electrical situation from their own particular viewpoints with central station men, manufacturers, jobbers and contractor-dealers. It had been said that it is difficult to get the electrical men of Montreal and Quebec to work in harmony, but there was no evidence of this at the convention and indeed, one could not help being impressed with the fact that there was a very great deal of team work evident at all the sessions.

The proceedings opened on Wednesday morning, Feb. 18, with a luncheon at the Montreal Electric Luncheon Club. At this luncheon about 450 were in attendance. In the afternoon Mr. Goodwin and others addressed the electrical contractor-dealers. In the evening the time was very pleasantly occupied for all the delegates and visitors by a smoker staged as only Montreal electrical men can stage such an entertainment. On Thursday afternoon Goodwin was at his best on the subject of "Merchandising"—its basic principles, ethics, etc.,—from the manufacturer right down to the dealer. This was also a very well attended and enthusiastic meeting and was prolonged until adjournment was necessary for the evening banquet, which was a brilliant affair, bringing forth some of the most interesting addresses of the whole convention and closing the proceedings.

If credit is due to one man more than another for the success of these "get-together" meetings of electrical men, it is to Mr. M. K. Pike, of the Northern Electric Company, Montreal. This does not mean that Mr. Pike did all the work, but it is only truth to say that he was always in evidence where work was being done and always seemed to be taking a little more than his fair share. The various committees were composed as follows:

Executive Committee

Chairman, M. K. Pike, Northern Electric Company, Ltd.
F. J. Parsons, McDonald & Willson Company, Ltd.
L. C. Haskell, Southern Canada Power Company.
S. W. Smith, Electrical Equipment Company.
R. Moncel, R. Moncel Electric Co.

Smoker and Entertainment Committee

Chairman, F. J. Parsons, McDonald & Willson Company, Ltd.
J. Dawson, Dawson & Company, Ltd.
A. D. Smith, Northern Electric Company, Ltd.
E. W. Sayer, Sayer Electric Company.
P. S. Fergusson, McDonald & Willson Company, Ltd.
R. J. Hiller, International Machinery & Supply Co. Ltd.
H. E. Blatch, Canadian Westinghouse Company, Ltd.
A. L. H. Jones, Canadian General Electric Co. Ltd.

Publicity Committee

Chairman, R. Moncel, R. Moncel Electric Company
C. Duncan, Duncan Electrical Company, Ltd.
D. J. Beatty, Northern Electric Company, Ltd.
A. S. Henry, Canadian Comstock Company, Ltd.
R. J. Beaumont, Shawinigan Water & Power Company.

Banquet Committee

Chairman, S. W. Smith, Electrical Equipment Company, Ltd.
C. Medbury, Canadian Westinghouse Company, Ltd.
G. K. McDougall, Consulting Engineer.
C. F. R. Jones, Northern Electric Company, Ltd.
D. McQuaid, Century Electric Company.
R. H. Balfour, Eugene F. Phillips Electrical Works.
D. H. Ross, Wagner Electric Mfg. Co. of Canada, Ltd.
A. E. Boyes, Duncan Electrical Co. Ltd.

Financial Committee

Chairman, L. C. Haskell, Southern Canada Power Co.
A. E. Boyes, Duncan Electrical Company, Ltd.
A. J. Carroll, Eugene F. Phillips Electrical Works.
W. P. O'Brien, Montreal Light, Heat & Power Company.
R. J. Beaumont, Shawinigan Water & Power Company.
F. G. Webber, The Bell Telephone Co. of Canada, Ltd.
A. J. Soper, Northern Electric Company, Ltd.
F. Thomson, Fred Thomson Company, Ltd.

Reception Committee

Chairman, M. K. Pike, Northern Electric Company, Ltd.
W. H. Winter, The Bell Telephone Co. of Canada, Ltd.
C. Medbury, Canadian Westinghouse Company, Ltd.
R. D. Linton, Canadian Comstock Company, Ltd.

The Electric Luncheon

The opening meeting took the form of the ordinary luncheon of the Montreal Electrical Luncheon Club, held for this occasion at the Windsor Hotel. There were over 400 present—a record for the club.

Mr. W. H. Winter presided, and read a letter from Mr. P. T. Davies, second vice-president of the Canadian Electrical Association, drawing attention to the fact that it was proposed to hold an electrical show in Montreal this year, in connection with the annual meeting of the Canadian Electrical Association. In order, however, to ascertain whether the exhibition would meet with sufficient support, a circular letter, making inquiries as to date, space, location, etc., was being distributed, and the questionnaire, it was asked, should be filled in and returned to Mr. Davies, Room 330 Coristine Building, Montreal. A representative committee would handle the exhibition. Mr. Winter added that a limited inquiry showed there was considerable interest being taken in the show, provided it was run for the benefit of the exhibitors.

Mr. Winter then introduced Mr. S. A. Chase, who expressed pleasure and surprise at the large attendance. Mr. Chase pointed out that the object of these gatherings was to educate and to harmonize the relations of all classes of those engaged in the electrical industry. In order to get together it was necessary that they should understand one another. The results of this work during the last two years in the United States had been truly wonderful. In the City of Washington, D.C., the conditions until about a year ago were chaotic; the jobbers were selling retail at wholesale prices; the central station was taking cut prices for appliances and lamps—when they were not giving the lamps away; the contractor-dealers would not speak to each other on the street. The latter were losing money and the better class of contractor went out of the contracting business. Then they tried co-operation, and since that date the men had been making money. The manufacturers in the United States were interested in the problems of all classes in a way that they were never interested before,—they were interested in such a way that they were furnishing funds for advancing the work. The central stations were coming into line; the jobbers recognized two classes in the industry by recognizing differentials in their prices, thus making for the stability of prices. Men of influence in the industry were giving time and money in endeavoring to co-operate in order to advance the industry. Those present would benefit by the work to the extent of the work they put into the movement of co-operation. The best way to get advantage out of it was to get together in the right spirit and with confidence in each other. "Live and help live," should be the slogan, rather than the old slogan of "Live and let live." Mr. Chase enumerated the following as a few of the difficulties experienced in living up to the former slogan—misunderstanding and selfishness; the inclination to encroach on other's territory; no definite plan of merchandising; and lack of confidence in each other. The question was, were all classes ready to recognize the services rendered by others, ready to adopt this slogan, ready to get together in the right spirit?

Mr. E. W. Rockefeller, sales manager of the Western Electric Company, related the experiences of his company in relation to the Goodwin plan. His company, he said, had done all kinds of work, but it was realized that they could not expect to progress if they did a wiring business on one hand and a jobbing business on the other. The wiring business was, therefore, abolished—as jobbers they should not be in the retail business, and it was decided to give up that branch. The company decided to cultivate the goodwill of the contractor dealer and to make him a good agent for the company. This policy had paid; in the various classifications of customers the company sold to, viz., twelve, the contractor dealer had always stood lowest in the old days in the matter of credits and collections. In 1919, however, he had risen from the 12th position to the third in the matter of collections. Mr. Rockefeller attributed this to the good work done by Messrs. Goodwin and Chase, in making the contractor-dealer a better merchant and dealer. His company had effected a change in its advertising policy and method of advertising. Their national advertising policy now, instead of boosting the Western Electric Company, boosts its customers, all classes of its customers, and it was a policy which paid.

The "Apostle" Himself

Mr. Goodwin opened his address by stating that he was not there to prescribe for every ill in the electrical industry of Canada. "We all possess the ability to do a better job and are willing to a better job," he said, "but the influence that prevents us from doing things that we otherwise would do is that we believe that the measure of success is the almighty dollar and in our mad rush to obtain it have adopted policies that have reacted beyond our anticipations." Mr. Goodwin went on to point out that the ethics of the engineering profession had at one time been the dominating influence in the electrical business, but that, owing to the popularizing of the industry and the evolutionary change from an engineering to a mercantile basis, it was necessary to evolve a new policy of ethics so that they did not fall into the gutter of unrestricted competition. There was no place in the electrical business for those who entered it merely for profit; they could better spend their energies in other lines of activity. We must come to realize that the profit in the industry was measured by the kind of service which the men in it offered to the public. The industry was the only one in the world that offered a solution of the problem of the rising cost of living. The electrical industry was yet in its infancy. In the United States the industry was not developed to 5 per cent. of its capacity, and he doubted if the development was 2½ per cent. in Canada. To-day they were faced by the danger of public-ownership, which was antagonistic to individual initiative. During the ten-year period of the wave of public-ownership it was found that wherever public ownership prevailed, dry rot was injected into the industry. The electrical industry and the public would profit by the degree of development based on reward of initiative offered to the men in the business.

Mr. Goodwin pointed to the Jovian Order and the Society of Electrical Development as illustrations of oranizations which had not lived up to their opportunities. He insisted that it was essential in order to bring the best results that they must have a plan. Any plan was better than no plan. Mr. Goodwin then traced the movement of organization of the electrical industry on the Pacific Coast. Investigations there showed that overhead was too high. Other conditions were also found to be undesirable, and as a result of an exchange of experience, a plan was formulated which grew until it was extended from the jobbers to the contractars, manufacturers, and central stations. The result had been that in the territory effected sales had grown from $1.50 per capita to $40.00 per capita. Mr Goodwin referred to the good results obtained in the State of California in the matter of co-operation in the fruit and fishing industries, by which production had been enormously increased, the prices to the public reduced, and the profits to those engaged in the industries enhanced. He went on to say that as regards central stations, 90 per cent. of the cost was in distribution, and argued that by a well-defined plan of distribution costs could be reduced to the public and profits increased to the central station. This had been done in California. Mr. Goodwin then went over the principal points of his plan, declaring that it was simplicity itself. He summed up by saying that the idea was to bring the groups of the industry together with the object of popularizing the use of Electrical energy.

On the motion of Mr. R. L. Calder, a vote of thanks was passed to Mr. Goodwin and Mr. Chase. Mr. Calder's speech was mainly of a humorous character, as he represented, he said, the ultimate consumer. There was, he thought, everything to be said for Mr. Goodwin's plan, and for the stamping out of that class of competition which was not the life of trade, but the death of trade. He was strongly opposed to Government ownership, and it was only by organization which would give a dividend both to the consumer and the industry, that the demand for Government ownership in the electrical industry could be staved off.

Meeting of Contractor Dealers

In the afternoon, Mr. Goodwin addressed a meeting of the electrical contractors and dealers, which was presided over by Mr. E. N. Sayer, who referred to the non-success which had attended efforts to organize the contractor-dealers in Montreal in the past.

Mr. Goodwin was very frank in his talk. He remarked that perhaps no other group in the industry had contributed in a greater degree to retarding the growth of the industry than the group represented before him. The dark spot in the growth of the electrical industry was the contractor-dealer. The contracting business and gambling ran upon parallel lines. Instead of being the stake-holder, he had been one of the poor "suckers," standing on the other side of the table. That was the position that the contractor-dealers present were in. They were putting up the stakes, and most of the time losing them. The consumer was generally the one who benefited, because, as a rule, there were contractors who were willing to take a job at any price. Their's was largely a business of guessing. Forty to 50 per cent. of a job was represented by labor, and the brightest minds in the world could not guess the productivity of labor. The contractor-dealer was also up against the question of guessing the cost of material, and also further guessing the cost of doing business. Not one in a hundred had any conception of the cost of doing business; as to overhead, there was very little head work in the business. Mr. Goodwin went on to point out the disastrous competition which contractors had to meet due to old conditions, and to the fact that the average mechanic believed that because he could solder two joints he was an electrical contractor. Such men either went along for years without progress, or fell by the wayside; in fact, 97 out of a hundred fell by the wayside. They did not trust their competitor, and nobody trusted them. Organization was the only means to correct such a situation.

The policies of the central stations, jobbers and manufacturers had contributed to this situation. The jobber was so hungry for business that he never stopped to consider the after effect of his policy, and they all knew how easy it was to get credit. The contractors must get together to clean their own house. They must do away with contracting not to the last degree, but in 95 per cent. of the work to be done they must establish a new system—time and material must be the principle to be established. A contractor would quote the lowest price possible on contractor work, and in the case of a client who gave his job on time and material basis, would soak him for every bit of overhead and the loss made on contract. The position should be reversed, and the contractor should do the best he could for such a client. All the way through the contracting business there was a lack of the intelligent application of business principles.

Local Conditions

Mr. Goodwin then referred to local conditions, remarking that he understood that several attempts had been made to form a contractors' association in Montreal. How many members belonged to an association? (A member: 23); well there should be 230 instead of 23. He suggested forming two distinct organizations—section organizations—which could divide themselves into natural groups. He suggested that there should be English and French sections. There might be an executive committee and group officers, and it might be, a third group. Such organzations could be tied together by means of an executive committee made up of two or three representatives from each section. In New York such sections met singly, and then about every three months they got together at a general meeting. This could be done in Montreal. The committees could also establish relations with the jobbers and manufacturers. Personally, he believed that jobbers should refuse to sell to men who were not part of such an organization. If he were an electrical contractor he would ignore any man who was not in the association. He would offer him every opportunity to come in; if he refused, ignore him.

There was no denying the fact that contractors, as a class, did not know their business. Contractor dealers were a sick lot. The question was, how were they going to get the men who were outside that room to join an association? The hardest thing in the world was for one contractor to get another contractor to get into line. They must get the manufacturer, the jobber, and the central station to do the work for the contractors. The jobber was the best man to do it. He would suggest that they make an inventory of every contractor in the city and vicinity; go to the jobbers and find out where the various men bought their goods and then place the responsibility upon the jobber to bring those men into the fold. If they got these men together then they should have an attendance record. It was often asked: What do I get out of organization? And the answer was. What have you put into it? Putting in money did not mean anything; it was intelligence —the application of intelligence in organized effort. From the standpoint of the jobber, the man who was outside the organization was a menace to the industry, and the jobber owed it to himself to refuse to do business with such a man. They were absolutely dependent upon each other in the industry. This applied to the central station man, the jobber and the manufacturer.

They would never get anywhere as contractors, unless they organized. "Don't get together," said Mr. Goodwin, "to put on a certain rate of oerhead on a job, or to fix prices." In the past, methods of lack of intelligent business direction had gone on until they had come down to a position where they were almost ashamed of the business they were engaged in, and they must devise a plan for preventing men going into the business without a proper understanding of that business, and certainly without a proper amount of capital. Here is where the jobber would come in. Let the dealer contractors refuse to do business with the jobbers who sold to men who threatened their industry with destruction.

Buy and Sell on "Policy"

Mr. Goodwin insisted that price should cut no figure in the matter of buying. "Buy on policy," he said. "never mind what is the price." Contractors sometimes asked for an extra ten per cent. in order to cut out and skin their competitors. but the contractor did not receive the benefit of this ten per cent. for he simply gave it away.

The contractors should have an organization which would meet once a week, but he warned them that it would take two or three years to feel the benefit of the organization. Mr. Goodwin concluded his speech by an analysis of the four classes that went to make up the electrical industry, and declared that the contractor needed a higher scale of intelligence than the other classes, but unfortunately, he said, they did not apply their intelligence to their line of business.

Mr. Kenneth A. MacIntyre, president of the Ontario Electrical Contractors Association, described the steps which led to the organization of the Ontario Association, and the success which had attended their efforts in this direction. He also referred to the features in the Goodwin plan which commended themselves to the Ontario men. In his view, it elevated the character of the business, and did away with the idea that the contractor-dealer was a mere parasite on the industry.

Mr. Chase asked the contractor-dealers to take advantage of the opportunities now presented to them. He urged all contractor-dealers to open retail stores—make them attractive, and open them in good locations. He said: "Don't do cheaper—do better—wiring, and educate your architect and owner to do better wiring; co-operate with each other, and buy locally; bury the hatchet, and look to the future."

Thursday Afternoon

On Thursday afternoon the talk was planned to chiefly interest manufacturers and jobbers, but actually resolved itself into a general talk on merchandising, and was probably the most interesting and valuable session of the whole convention. Closer co-operation between the manufacturer, jobber, contractor-dealer and retailer was urged by Mr. Goodwin. To increase to its utmost possibilities the manufacture of electrical goods in Canada, and not to import such goods from the United States, unless the demand of the consumer outstripped the supply of home manufacture, was the duty of every Canadian connected with the electrical business as manufacturer, jobber, contractor, or dealer.

The necessity of a trade association which would include the manufacturer, the jobber, the contractor-dealer and the retailer, was urged strongly by the speaker, who said that the present system of keen competition between every branch of the trade was not the life, but the death, of the business. The jobber ought to be eliminated as such, becoming instead the distributing agent for the manufacturer.

The jobber for local manufacturers who attempted to be also an importer and foreign manufacturers' agent ought to be forced out of business altogether in the interests of the electrical business in general, and Canadian electrical trade in particular. Mr. Goodwin supported these contentions by showing the advantages of co-operation under a trade association, by which each representative of a branch of the business could be a specialist in his own line, but could also keep in touch with the other branches through the workings of the association. One thing the trade association must guard against was the fixing of prices. Such fixing of prices would lead to misunderstanding, and the price of any commodity was, at any rate, the sole business of the manufacturer of that product. Any attempts to control business by arbitrary methods always failed. In the United States price fixing was illegal, and besides price agreements restrained human activity, and that was immoral.

An interesting survey of the field for electrical business covered, and to be covered in the United States, was given by means of charts. These showed that fifty per cent. of the users of electrical devices in the United States lived in the large cities, and that even in these cities only twenty-five per cent. of the houses were wired. The electrical business in Canada, in Mr. Goodwin's opinion, is at even a lower stage of development than that of the United States. The reason given by Mr. Goodwin for the lack of development in this business was due to the fact that the retailer did not know how to present this special line in an attractive light to the public.

Retail merchandising was a specialized function in itself, and an ounce of information passed out to the public by the retailer was worth ten pounds passed out by the manufacturer. The personality of the owner of a retail store had much to do with success. He must be of good standing in the community, identified with public interests, a member of local organizations, and. finally, a good mixer. One of the most important things was the location of the store. The electrical contractor went off to some out-of-the-way place where the rents were low, instead of getting next to some important buildings such as post-offices, departmental stores or other places where crowds gathered. The overflow from the department store was the greater thing for the smaller dealer.

The sales force of the organization had a lot to do with the measure of success obtained in retail merchandising. Clerks should be developed in the industry. Another great fault of the retailer was the amount of obsolete goods he had stocked in his store and windows. Get the obsolete goods out of the store, and put modern goods in the windows. Condulets and pipe fittings were not useful as window decorations.

In referring to the salesman, Mr. Goodwin said that he must know his stock, where to find it, and the price of each article. Talking points was another great asset which was absent from the electrical industry. The psychology of selling was to develop the good points of the things one had to sell. "In trying to sell your own goods," said Mr. Goodwin, "don't run down your neighbor's. This is one of the chief faults in any business to-day. The good arrangement of the fixtures you have to sell is an absolute necessity. Hang five or six different fixtures up, one of each type, and store the rest down in the cellar. Utilize the top of the show case for fast-moving goods."

In connection with window dressing, Mr. Goodwin stated, that one of the most important things was the color of decorations used. For instance, red should not be used when displaying fans, because red was a color that suggested heat. The lighting of the window was a very important matter, and also the dressing of the windows. This should be done by some responsible person.

In regard to the sale of the larger appliances such as vacuum cleaners and washing machines, Mr. Goodwin advised the retailers to sell these on the instalment basis, and ten per cent. should be added to the selling price for deferred payments. He spoke very strongly in regard to advertising. Trade papers were, in his opinion, one of the greatest helps that a manufacturer, contractor-dealer, and retailer could get. He advised the use of the posters and helps which are provided by the manufacturers. In closing, Mr. Goodwin referred to the necessity of frequent changes of copy in the papers the firms were advertising in, and also care in the preparation of copy.

Mr. S. A. Chase, in a brief talk preceding the main address, demonstrated, by charts, the improvements in the methods of placing electrical appliances and the importance of the electrical business before the public. A great increase in newspaper advertising was shown to have taken place within the past two years, also the effectiveness of trade publications had been increased by using better paper and making the publications of a style to appeal to popular taste.

Mr. M. K. Pike, of the Northen Electric Company, Limited, acted as chairman of the meeting.

The Evening Banquet

A banquet was held in the evening, and was very largely attended by representatives of every section of the electrical industry. Mr. Walter J. Francis presided.

After the toast to the King had been honored the chairman proposed "The Dominion," which was responded to by Col. F. W. Hibbard, K.C., chairman of the Quebec Public Utilities Commission. Col. Hibbard described Canada as a country of great possibilities and no small achievements, with its greatness now in the making, the results depending on its citizens who were sound of heart. It is to be deplored, said the speaker, that there had been manifested in this country the beginning of a factional party in politics. Nobody can challenge, he said, the great possibilities that lie before an agricultural population and their deep feelings towards the land to which they belong, but on the other hand, a farmer's party is hardly to be desired or justified any more than a dentists' or a lawyers' party. The speaker felt sure, he said, that if those present formed an electrical development political party, they would not short-circuit the rest.

Referring to Canada's prompt action and full share in the war. Col. Hibbard stated that he felt sure that this country would not fail to do her share in the police duty of maintaining order, fair play and justice in the world now. "And," he added, "we are equipped to do it; the British Empire is, in itself, a goodly league of nations, and will not fail to do its duty in rendering justice and freedom in the world, nor will Canada lag in that splendid work. We are a nation within a nation and will, I hope, stay there under the Union Jack which has stood generally for union, progress, peace and freedom in the world."

The Province of Quebec was the next toast and was replied to by Hon. Chas. Marcil, who, in his native tongue. referred to the discoverers and founders of Quebec and

A section of the delegates who attended the "get-together" meetings at the Windsor Hotel, Montreal, on February 18 and 19, 1920. This photo was taken on the occasion of the Banquet in the Rose Room on Thursday night. The prominent faces shown indicate the widespread interest taken in the movement by the most influential men in the industry. Mr Walter J Francis, Montreal, presided.

their historic adventures as pioneers down the Mississippi and as far as New Orleans. He also described the work of the men of Quebec in engineering, power development, literature, arts and science, and impressed upon his compatriots the desirability of becoming interested in electrical work of all kinds.

Mr. A. R. McMaster, K.C., M.P., also responded, saying that rather than speak of the resources and industries of the province, immense as they were, he would talk of the people. Two years ago Quebec was denounced as the black spot in Canada, but the pendulum had swung the other way; the extravagance of vituperation had given way to the extravagance of praise. He described the Province of Quebec as being a bright spot in the world to-day as far as contentment was concerned, there being no place where people were willing to give an honest day's work for a fair day's wage to a greater extent than in this province. The speaker referred to the depreciation of currency and said there was never any depreciation in the currency of courtesy and politeness, two qualities that the province is well known for. "Let us endeavour to show," concluded the speaker, "not only to the rest of Canada but to the whole world, that people diverse in blood and religion can work together in harmony for the well being of the country they both live in."

The City of Montreal was the next on the toast list, and was replied to by Acting Mayor Sansregret, who thanked the organization for holding the convention in Montreal. He hoped that French-Canadians would in the future go in more for electrical work.

In proposing the toast of "The Electrical Industry," the chairman referred to the immense developments of the industry.

Mr. S. A. Chase, who responded, alluded to the fierce competition in the past—a cat and dog fight he termed it—compeition without reason. He urged upon those present to avoid these jealousies, and to so harmonize the industry that in future they could work together for their mutual advantage.

Mr. C. T. Baldwin emphasized the fact that the technical press of the United States and Canada was at the back of the Goodwin campaign.

Mr. Goodwin stated that he had at times spoken in harsh terms, but if they accepted that language in the spirit in which it was meant then at least a part of his mission had been done. It was sometimes necessary to speak in harsh language to arouse people, and if he had used strong terms it was only to inspire them to greater effort. The responsibility of every man in the electrical industry was beyond conception, and if someone could inspire them to a sense of that responsibility then victory was achieved. They must be inspired to greater effort, for they were called upon to perform greater service for the cause of humanity. The industry possessed great possibilities in relieving the wants of the people. The industry was not a commercial business; it was professional in every sense of the word and must be handled in a professional way. If the ambition of the almighty dollar was the sole ambition they could never serve society as they should. In Ontario they were faced with one of the most severe and most destructive forms of competition that ever faced mankind. In Quebec the destiny of the electrical industry rested upon the measure in which they responded to the demands of the public. The demand upon the electrical industry exceeded $700,000,000 annually, and unless they received fair treatment on the part of those who represented the Governments and could secure proper returns, the capital would not be forthcoming.

Mr. Goodwin referred to the immense strides made in Quebec in the matter of electrical development,—California was the only place in the world that exceeded the province of Quebec in the matter of electrical development. He also stated that he understood that Montreal exceeded any other city in Canada in the use of electricity per capita. The province of Quebec, so far as electrical enterprises were concerned, was described as being under sane, sensible, governmental direction. As this development in Quebec had been largely through the investment of private capital, so would new capital be invested as opportunities were given for expansion. In problems that they approached, the final decision must be based on the importance of the following order,—1st, the interest of the public; second, the interest of the electrical contractor-dealer; third, the group organizations; fourth, individual companies; fifth, the individual.

Mr. Goodwin then referred to the founding of a thought organization,—which, he said, was needed for the proper development of the industry. The application of scientific study was also needed for the solution of problems in the industry. They needed a central organization not only in Canada and the U. S., but throughout the world, and they must bind together all those great potential forces throughout the world, so that the organizations could be developed to a maximum force.

Ground Clamps According to Specification

The Hydro-Electric Power Commission of Ontario are distributing to Ontario manufacturers and jobbers of ground clamps, copies of the specification of the Hydro-Electric Power Commission of Ontario for ground clamps, dated March 1919. Notice is now given by the Commission that on and after March 1st, 1920, all ground clamps manufactured in Ontario shall be constructed in conformity with this specification, as set forth in the Rules governing Approval of Electrical Devices, Fittings and Material. The main points of difference between this specification and the requirements which have been in force to date are:

(1) The use of hot-galvanized sheet steel of minimum thickness of No. 16 U. S. gauge (0.0625 in.) is permitted.

(2) The thickness of sheet copper when such is used must not be less than No. 16 B. & S. gauge (0.051 in.).

(3) The lug or equivalent which may be formed in the metal of the clamp is required to be tinned by the manufacturer.

(4) Each clamp must be marked with the manufacturer's name or trademark and also with the sizes of conduit or pipe for which it is designed.

It is also suggested, as pointed out in the specimen Re-Examination Agreement form printed in the Rules above mentioned, that the manufacturer stamps or marks each clamp where practicable with the "H.E.P.C. Approval No.——" assigned to it.

This Approval Number is assigned only to devices which have been submitted to the Commission for examination and have been listed as approved. Manufacturers who have not yet submitted their clamps for approval are therefore requested to do so as soon as they have completed samples which will meet this Specification.

Jobbers and other agents are also notified that after March 1st, 1920, none other than clamps approved by the Hydro-Electric Power Commission under this specification shall be imported into this province and that every effort shall be made to dispose of existing stocks of ground clamps of lighter weight at as early a date as possible.

Mr. R. B. Woolley, who has been director of publicity of the Society for Electrical Development, Inc., for the past two years is now with Thos. F. Logan Inc., Advertising Agency, New York City.

New Electric Stores

The Atlas Electric Co. opened a store in December last at 3180 Dundas St. W., Toronto, for the sale of electric fixtures and supplies also appliances of every kind for the home. Two of the partners were in France, Mr. Ward having won the M.C. At present they are specializing in electrical contracting.

On Dec. 1st, 1919, a new electrical store was opened under the name of Casey & McKee at 1292 Danforth Ave., Toronto. Mr. Casey was a Lieutenant with the 58th Battalion and was overseas nearly four years. Mr. McKee has a distinguished record being a sergeant with the 4th C.M.R.'s and holding the D.C.M., M.M. and M.S.M. They carry a stock of fixtures and supplies and are open for any kind of electrical contracting work.

During Nov. 1919 an electrical store was opened at 1556½ Danforth Ave., Toronto, under the name of Briggs & Nicol. They stock appliances, fixtures and supplies, and are electrical contractors besides. Mr. Briggs was overseas for two years with the 2nd Field Company Engineers.

H. C. Stacey has opened a store recently at 1821 Gerrard St. East, Toronto, with a stock of fixtures and appliances, and supplies of all kinds. Mr. Stacey also does electrical contracting of all kinds. Before going to France Mr. Stacey was in partnership with Mr. Fowler under the name of Fowler and Stacey with offices in the Stair Building. This firm wired the first twenty-one cinemas in Ontario for Mr. John Griffin.

Another returned man who has opened an electrical store is Mr. T. Berkeley-Irwin. He carries a good stock of fixtures and supplies and is also a contractor. The store is at 284 Danforth Ave., Toronto. Mr. Irwin was for several years in the Mechanical Department of the University of Toronto.

Messrs. W. Brown and A. Kitson, have recently gone into the electrical contracting business at 829 Gerrard Street East, Toronto. W. Brown was overseas three and a half years with the 2nd Battalion Engineers, and A. Kitson four years with the 75th Battalion C.E.F.

Messrs. W. Sherwood & Sons have recently opened a repair shop at 287 Jones Avenue, Toronto, for repairing motors and dynamos, and for installation of motors.

Mr. T. W. Finlay has recently opened a store at 105 Pape Ave., Toronto, for electrical contracting, fixtures and supplies.

Messrs. W. J. Munns and W. Howlett, late of Otis-Fensom Elevator Co. Ltd., have recently opened a repair shop at 9 Burnfield Avenue, Toronto, and will be known as the Kenwood Electric. Motors and electric appliances installed and repaired.

Messrs. King Bros. have recently opened a store at 230 Jones Avenue, Toronto, for electrical contracting, fixtures and supplies. Mr. J. King recently returned from overseas after being three years with the Canadian Expeditionary Forces.

Mr. Glyn Osler, of Toronto, and Mr. G. D. Milne, treasurer of the American Telephone and Telegraph Company, New York, have been appointed directors of the Bell Telephone Company, in succession to the late Mr. Z. A. Lash, K.C., and the late Mr. N. C. Kingsbury.

Batteries should not be located where fumes or gases which carry injurious elements may be absorbed by the electrolyte. This condition might easily obtain in a chemical works or near refrigeration plants or stables where ammonia gas particularly is present.

The Awakening of Dealer “Lumsden”

Takes Further Advice From His Salesman Friend, Mr. Brown, and Finds His Business Increasing Beyond His Capacity

The taste of success which Lumsden had had since following the advice of Brown the traveller, had made him very ambitious to do something else in the way of improvement. He had, however, been so long in the rut, that he found it very hard to think up ideas which really appealed to him as being worth while. He wanted, if possible, to do without Brown's help, so that when his friend called again in the way of business he would see that the store was making headway. He erected an electric sign over the entrance to his store, and cleared out an old store room at the rear of the shop, having the partition wall removed. This he used partly for additional stock and partly as a demonstrating room for the larger appliances. These improvements at an end, he decided upon a good advertising campaign. Having reached so far he came to a standstill, and finally decided he must send for Brown. He wrote a note which read:

Dear Old Advice Giver:

Having stirred up the spirit of ambition within my manly breast, and having as a result lost many many hours of sleep trying to satisfy that ambition, without results, it is up to you to come and help a pal. Come and have dinner with us on Friday evening at seven sharp.

Yours,
Lumsden.

The answer came by phone:

“Hello, that you Lumsden? Thought I'd just tell you I would be with you on Friday, with pleasure. How's business?”

“Business? Fine and dandy as per.”

“Alright, oh man of electricity, I will be with thee.”

On Friday evening Brown arrived at Lumsden's store with some little wonder as to what his friend had in mind. It had given him no small degree of pleasure to note the growing enthusiasm of Lumsden, and he, personally, was prepared to back up the dealer with all the means in his power.

Dinner passed off very pleasurably. They agreed beforehand to cut out all business talk and content themselves with ordinary subjects of interest. Dinner over, however, the two men went into the den, and Lumsden produced cigars. After lighting up, Brown commenced the real business of the evening by asking Lumsden what was on his mind, and assuring him that he would give him all the help he could, and also could assure him of the backing of his company.

“Well,” began Lumsden, “I have come to the conclusion that having made one spurt and benefited by it, I should be a fool not to continue in the good work. It would be silly to think that the success which has come to me will continue unless I maintain my efforts. My mistake in the past is that I have been too content to let things take their course and consequently I have not educated myself to think along lines of progress. I believe you can help me and I am willing to back up any suggestion you make as long as it is within my power.”

“Mr Lumsden after reading your advert in a local paper I would be pleased to have you call at my house and take an order for a number of Electrical Appliances that I would like.”
And still they come!
ORDERS
A J Mor

Advertising creates a greater demand than he can supply

“What was your idea?” asked Brown.

“Advertising,” laconically answered Lumsden.

“Have you thought out any scheme?”

“No, I must confess that I haven't been able to get that far. I have never done any advertising, but I realize its value. You, however, have had lots of experience in the best means of advertising, and I rely on you to help me out.”

Brown remained deep in thought for a few minutes and at last said “Have you ever made use of the means of advertising which many manufacturers are only too willing to put in your hands, free of charge?”

“What! manufacturers give something away? Say, boy, prohibition has certainly played havoc with your mental powers.”

“But, Lumsden old man, I am serious. While you have been buried down here in this obscurity, things have been happening in the great big world of which you know nothing. The fact is, the manufacturers, seeing that either the dealers did not care whether the public were informed of the value of the goods which they sold, or could not afford to spend sufficient sums in advertising, decided to prepare some helps which the dealer could have for the asking. They take the form of window display helps, newspaper advertising helps, and any amount of free advice from specialists.”

“You certainly surprise me.”

“You are not the only one who is surprised along this line from time to time, although most of the dealers really know of some of the helps, without, apparently, wishing to take advantage of them. But the point is that it is not of any concern to either of us as to what others do or do not do. Let us begin at the beginning, then, and cover the whole scheme of utilizing the various helps which the manufacturers are willing to put at your disposal.

“I noticed when passing through your store that you had made some alterations which appear to me to be wisely planned. Now, when dressing your shelves be sure to use colored cartons in which the bulbs come. Be sure that you are getting the best of makes, and use the name for all you are worth. Send to the various firms with which you deal and ask for all the helps they can send you. You will receive nicely gotten up cards some of which are quite large and specially suited to advertise different articles. You will not, by this means, need so much stock in your window and, besides, will create the impression that you are a great believer in this particular brand of article and are not afraid that the public should know of it."

"And you say that I will not have to pay for these things?" broke in Lumsden.

"No, not a cent."

"In what other way will they help me out?"

"Why, they will send you a specialist in window dressing, and he will tell you how to make the best use of your windows, and will also dress a window for you if you want him to. They will also send you some big cards to fix on the sides of your delivery van, and loan you slides which, for a small sum, the local movie people will throw on the screen during the intervals. Then you can go ahead and do some real newspaper advertising. Get an expert to plan it for you. Link up with the manufacturers' national advertising scheme; have the same cuts put in your advertisements as the manufacturers have in theirs, and at the same time, and thus let it be known that you are selling goods with a world wide reputation."

"Eh, steady on old man, let me take some of this in. If I understand you aright you want me to advertise big in the local papers. Where am I to get money for such cuts as you suggest?"

"You don't have to buy the cuts. The manufacturers will loan them to you. You simply write to them for the list of periodicals in which they will advertise; the date of their appearance; and the electros to match. These latter will cost you the return postage only."

"I don't think I quite understand this national advertising scheme. In what way is it national?"

"It simply means that the manufacturers have chosen certain periodicals, which have a nation wide reputation, in which to advertise. These are beyond the dealer for the most part because the cost of advertising in such a way, is great. But you can make use of the advertisements already contracted for in the periodicals if you know when to expect them. This information you can get from the firm with which you deal. Our firm will supply it I know; indeed I will take it upon myself to have them send all you require. Well then, suppose you have been informed that in March there will appear advertisements in such periodicals as the Atlantic Monthly, Scribners, Review of Reviews, etc., and that they will advertise table appliances, then you simply advertise the same things in your local papers on the same date, or a day or two afterwards. By this means you link up the manufacturers' advertising with your own, and it becomes as valuable as if it were your own. Then, you use the cuts loaned to you by the manufacturers, and consequently all your own advertising costs are for space only. Every way you look at it you are getting good advertising and, for the most part, at someone else's expense."

Lumsden was deeply interested and remained thoughtful for several minutes. "But where do the manufacturers get off at?" he said finally.

"Why your increased sales mean increased sales for them."

Brown got up to go, saying: "Think about it you old reprobate, and let me know the result. The trouble with you is that you are still a little conservative."

"And the trouble with you is that you think only of swelling that already fat commission which you have the cheek to hold out your hand for every month."

"What does that matter if it brings you in better business and a fatter bank account?" was Brown's last word as he laughingly made for home.

The next day Lumsden got busy and wrote to the several manufacturers with whom he dealt and asked for any help they could give him. He was not very optimistic as to the result, for while he was satisfied that Brown's firm might provide such helps for their customers, he could not believe that such schemes were general. The answers he received convinced him that for several years he had been very blind. Now he must make up for it.

He had a window dresser come and dress his window for him with irons. It was arranged in the following way:

The right hand corner of the window was decorated with irons. A series of four steps draped in Peacock Blue with a background of silver grey, formed the stand and background for the irons. The remainder of the window was dressed to represent a laundry and a large cardboard figure of a lady standing at a table using an iron. This was supplied by Brown's firm. A mechanical arrangement driven by a small motor caused the arm of the lady, with hand holding the iron, to move at intervals. In the evening the lights in the window were so arranged as to alternately throw a light on the laundry and on the irons in the corner. One or two small well placed cards explained the good points of the irons.

Lumsden also carried out as soon as he could get around to them, the other suggestions of Brown and almost immediately began to note the effect of such definite, persistent advertising.

It was a month later that Brown called to see how the new scheme was working, and Lumsden met him with a smiling face. "Say, oh king of drummers, I certainly like to see your homely face. You should thank the fates that they did not give you good looks instead of a good head. Do you know, Brown, that I have just doubled last month's sales. Why, I even had some enquiries over the 'phone from a district two miles from here. I followed up the enquiry and called at the home of the lady in question and not only supplied her with some appliances but happened to suggest some improvements to her lighting in the laundry. Well, I fitted that up and she was delighted, so much so, that she took me over the house and had me advise her with regard to a change in the whole lighting system. That is not the end of it though, for she recommended me to some friends of hers, and there appears no end to the results of that first telephone call.

"Did she tell you what made her ring up?"

"Yes. It seems that she is a great reader of the Atlantic Monthly, and looking through the advertisements she was attracted by a particular kind of washer. She had one of the hydraulic type and was not satisfied with it. She was wondering who was the local agent for the electric washer she had noticed in the Atlantic, and happened to see my advertisement in the local newspaper. So there you are. And by jove, Brown, I owe you another dinner for that."

"I'll claim it, don't you fear," laughed Brown as he left the store. And to himself he said "It looks as if I'll keep Peter busy recording my good deeds."

The Ontario Power Commission will take over the Sandwich, Windsor and Amherstburg Railway on March 1st of this year, when new equipment, including one-man cars, will be tried out. It has been suggested that a line running along Erie St. to connect with the Walker Road line in Walkerville is necessary to take care of this rapidly growing residential district.

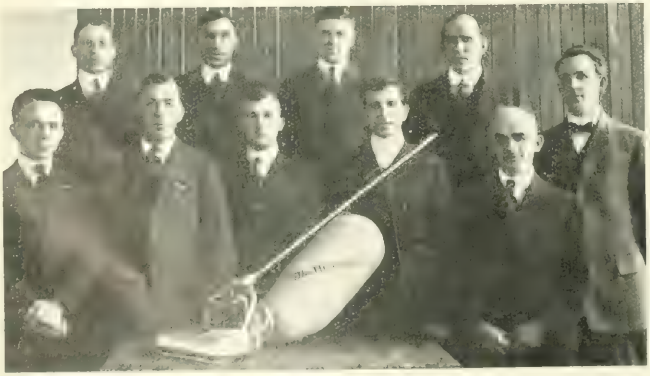
Fine new factory of Hoover Suction Sweeper Co. of Canada at Hamilton, Ont.

The Canadian Made "Hoover" has Arrived

The Hoover Suction Sweeper Company of Canada are off to a fine start, if one may judge by the impression created some two or three weeks ago on the prominent guests who inspected the company's new factory at Hamilton Ont. The U. S. home of the Hoover Sweeper is in Dayton, Ohio, but a few months ago it was determined that the future policy of the company would be to manufacture the Canadian demand and also the demand in Great Britain at some Canadian point. After careful consideration of the locations offering, Hamilton was chosen, the chief determining factor, according to Mr. Hoover, being that the labor situation in Hamilton appeared to be more stable than in most cities, on account of the more liberal treatment in the way of comforts and similar considerations offered employees by the various managements. That this is Mr. Hoover's idea of the treatment of his own employees is shown by the fact that the new factory supplies conveniences of all kinds to ensure a maximum of comfort and efficiency.

The visitors were shown over the plant and watched the operations in the manufacture of the various parts of the sweeper. The factory has just reached the stage where the first machines, entirely manufactured in the factory, are being turned out; the only exception to this being the motor which is of the well known Robbins & Myers make, built to Hoover specifications. One of the photographs reproduced herewith shows Mr. Kelly, sales manager of the Canadian company, and the heads of the factory departments, very proudly displaying the first sweeper turned out from the Canadian factory.

At present the staff of the company is about 100 and the daily output around 30 sweepers, but as soon as the plant gets nicely under way, production will be increased to about 200 per day. Of this latter figure, it is estimated that per-



Hoover Suction Sweeper Co. of Canada's Department Heads in the new Hamilton Branch—Upper row—H. W. Calhoun, Shipping; R. Syler, Service; J. C. Boswell, Clerk; Earl Dunn, Foundry; E. R. Sundquist, Machine. Lower row—H. Warburton, Assembling; Thomas F Kelly, Sales Manager; W. G. Vogt, Office Manager; T. H. Lovejoy, Factory Supt.; Thomas Prendergast Polishing A "close-up" of the genial sales manager is shown at the right

(Rear row—left to right)—R. Banwell, Salesman, Guelph and Galt, Ont.; C. C Swain, Salesman, Windsor, Ont.; H. C. Elschner, Salesman, London, Ont.; A. P. Reed, District Manager, Ottawa, Ont.; E E. Parsons, Salesman, St Thomas and Woodstock, Ont.; R. N. E. Connor Salesman, Toronto, Ont; H. J. Moore, Salesman, Toronto, Ont; Frank Ritz, Salesman, Toronto, Ont C E Lillie, Salesman, Toronto, Ont

(Front row—reading from left to right)—J. Skelton, District Manager, Toronto, Ont.; Martin L. Pierce, Merchandise Manager, North Canton, Ohio; Mr. H. W. Hoover, General Manager, North Canton, Ohio; Thomas F. Kelly, Sales Manager, Hamilton, Frank G. Hoover, Associate General Manager, North Canton, Ohio; Lloyd Maxwell, Vice-President Erwin & Wasey Co., Chicago, Ill., Miller Munson, Erwin & Wasey Co., Chicago, Ill.; Geo. T. White, District Manager, Windsor, Ont.

haps half will be exported to England, where a very insistent demand has already been worked up for the Hoover sweeper. Indeed, this demand is so great, Mr. Kelly states, that the adverse price conditions introduced by the exchange situation do not appear to be affecting the amount of their turnover in England at all.

The Banquet

The celebration of the opening of the factory was continued in the evening at the Royal Connaught Hotel, where Mr. Thos. F. Kelly, the sales manager of the company, presided at a complimentary banquet including a large number of prominent business men, financiers and public officials from various points in the province. Hon. W. R. Rollo, Minister of Labor in the Provincial Cabinet, proposed the toast to "Canada" and Gen. Mewburn responded. Mr. A. C. Garden proposed "Our City" and Mayor Booker replied. "The Company," was proposed by Mr. George H. Douglas, chairman of the Ontario Division of the Canadian Manufacturers' Association, and elicited a splendid address from Mr. H. W. Hoover, general manager of the company, who stated that the one thing most influencing his company in making their decision to locate in Hamilton was the fact of the large number of working men who owned their own homes. Mr. Hoover remarked that the company had sought no inducements in the way of tax exemptions, or such things, in locating in Hamilton and that they had financed the enterprise without assistance from any outside source. He also emphasized one other point, namely, that the Hoover Suction Sweeper Company dealt only with dealers. The policy of the company is to maintain its own warehouses and warehouse managements at various points in Canada, which act as distributing centres and from which a prompt service can also be relied upon.

"Our Dealers"

Mr. F. G. Hoover, associate general manager of the company, popularized himself with the men who will handle Hoover sweepers, by proposing the toast "Our Dealers". He emphasized the fact of the company's desire to co-operate always with their dealers and to give them every assistance in increasing their sales. It would always be their endeavor to use the best materials obtainable so that the best possible product may be turned out and on this account they were endeavoring to obtain, in every locality, the co-operation of the best dealers. This toast elicited a number of replies, among those speaking briefly being: E. C. Budd, of the Robert Simpson Co., Toronto; S. Ewing, president of T. C. Watkins, Hamilton, and E. V. Buchanan, general manager of the London Public Utilities Commission.

A feature of the evening was the presentation of the two first sweepers turned out in the Canadian factory to Mr. C. W. Kirkpatrick, Industrial Commissioner of Hamilton, and to Mr. W. H. Cooper, the general contractor in the erection of the factory. Both these gentlemen came in for eulogistic remarks, the Industrial Commissioner on account of his success in securing the Hoover Company in competition with so many other Canadian cities, and Mr. Cooper, for the very excellent results he had obtained in the construction of the factory. Mr. Cooper was given this job on a cost-plus-percentage basis and the company expressed the greatest satisfaction with his work throughout.

One of the illustrations accompanying this article gives a fair idea of the excellent conditions under which the Hoover sweeper is being manufactured. Another, as already noted, is a group photograph of the heads of the manufacturing departments. The second group portrays a number of Hoover dealers, located at various points in Canada and we are also glad to reproduce an excellent photograph of Mr. Thos. F. Kelly himself, the genial and capable manager of the sales department.

How the Heating Pad Helps

In many homes the hot water bottle has been for years the panacea for pain, but recently something better has arrived to take its place—the electric heating pad. First of all it has heat and it is light in weight. It is flexible and easily wrapped around the kiddies' cold feet, or it fits snugly into grandfather's aching back. It has a controlled temperature, instead of being first too hot and finally cold, the heat pad may be warm, warmer, warmest, and it will maintain the desired temperature.

The best hot water bottle is bound to leak sooner or later. It's the very nature of rubber to harden, crack, then leak. The pad is ready almost instantly. All you have to do is to take the pad from its box, attach the cord to nearest lamp socket or convenient outlet, apply to spot.

This is what you have to do if you use a hot water bottle; first, find the bottle; fill the kettle and heat the water; fill the bottle, perhaps scalding your fingers, surely spilling some; dry the outside of the bottle, wrap it in a woolen cloth because it is nearly always too hot at first, apply it as best you can to aching back or lame shoulder. Repeat the heating, filling, wrapping process as fast as it cools.

A heat pad will outlast several hot water bottles and it is cheaper in the end. It is the thing you want in case of sudden chill, pains, aches, neuralgia—for the quick relief it gives.

How I Sold a Percolator to a Customer Who Didn't Want It

By J M Harris

Two or three salesmen in our store had tried their utmost to sell a percolator to Mrs. Stewart, but hitherto without success. She was the talk and despair of us all, and at last the boss offered a prize of five dollars to the one who succeeded in accomplishing the apparently impossible sale. The fellows who had already tried, tried again, using all their blandishments, all their arguments, any scheme that occurred to them; but all in vain. Meanwhile I had been thinking the matter over and had decided upon a map of campaign. I reasoned that in all probability she was refusing on one reason only, and my job was to know that reason before I attempted to sell to her. By very careful questioning of the other salesmen I found that she usually closed all argument by saying: "I have made coffee for forty years and no one has ever said that they did not like it, and I guess I won't change now."

This was something to work upon. The next thing was to find out something of her home life. First of all I ascertained her address, and made some enquiries from customers who lived in the same neighborhood as Mrs. Stewart. From them I learned that the old lady was highly respected, but, as I guessed would be the case, she had one peculiarity which the neighbors bemoaned. She was, in their language, 'rather near,' or in plain English a little inclined to be miserly. I had my cue and was not slow to make use of it.

First of all I got permission of the boss to fit up a percolator in a convenient place. Then I got my wife to get me some of the best coffee and loan me a cup and saucer, cream jug and a small receptable for sugar. These I had arranged on a trap out of sight and covered with a clean white cover. The coffee I placed in the percolator and every morning put in clean water. As I stayed at the store for lunch I arranged to get a small bottle of cream and some of this I kept in the cream jug. All was now ready for the victim, and I frankly admit that the offer of five dollars, while not to be turned away, was not my primary motive for going to such trouble to sell a percolator to a certain lady. It was my reputation as a salesman. A distinct challenge had been thrown out at us and I for one was not going to pass it by.

Two or three days passed by and Mrs. Stewart did not come in. All the other fellows had promised to give me a clear field, and I waited with impatience for what I felt was going to be my Waterloo as a salesman.

Then one day when I was beginning to get very impatient I saw her entering the store. The percolator was standing on the showcase and I very quietly slipped in the plug, and walked across the store to meet her. Smilingly I asked her what I could get for her and she asked for two bulbs. I manoeuvred her towards the showcase and left her there while I went for the bulbs. I purposely delayed a little to give the percolator time to get working well and for the aroma of the coffee to pervade the store.

As I returned to her I noticed that she was gazing intently at the percolator and seemed extremely interested with what she saw. It was a big temptation to start in talking to her about it, but I had made up my mind that the first question should come from her, and as many more as possible. She took her parcel in silence and turned away. My heart gave a painful bump. It did seem for a moment that I had after all bungled the business. However, she turned round and gave a glance at the percolator and by this time it was showing the right color. Curiosity was too much for her, she came back to the showcase and said:

"Young man, how long does it take to make the coffee with this arrangement?"

"Twelve or thirteen minutes with cold water, Mrs. Stewart! About six minutes with hot water."

"Hmp! That saves a few minutes from the old way," she said, "but you can't get as good coffee from this way of making it."

I did not answer her at first, but bringing to view the tray and uncovering it, I said, "Just a moment! Would you care to taste it?" and I poured out a cup and handed her the cream and sugar. She seemed very surprised, but took the coffee and prepared it to suit herself. When she tasted it a bigger look of surprise than ever came over her face. She finished it up and as it happened to be a very cold day asked for more.

"Young man," she at last said, "you have taken me by surprise. Everyone else in this store has tried to sell me a percolator but none of them have had the sense to give me a practical demonstration of its good quality. But I haven't decided to buy yet. Tell me briefly what other good qualities it has."

"Well in the first place, Mrs. Stewart, it costs less to operate, it saves the running about from the table to the stove, and in hot weather it prevents your having to hang over a hot stove to make it. It saves time, because you can prepare it the night before and simply start it working the moment you get up. From the moment you start it, to the moment you are ready to drink it you need not give it any attention. The flavor is excellent, being equal to that made the old way with the addition of an egg. Thus you save the egg and get as good results."

"But if you should forget and leave it working until all the water is evaporated the expense of renewal would be greater than in the old kind of coffee pot," she said.

"But, madame, you can't burn out a percolator because when once the pot has run dry a mechanical arrangement in the base of the percolator goes into operation and switches off the power."

"Oh, I did not have that explained to me before."

That was all that was necessary. Convinced that I had told her the truth, she arranged to have one sent up, but could not resist the temptation to say, as she went out of the store: "Well, young man, you can look out for squalls if any of the things you have told me are not correct". But she smiled and I felt that I had no need to worry. I received the congratulations of all present and the $5 from the boss.

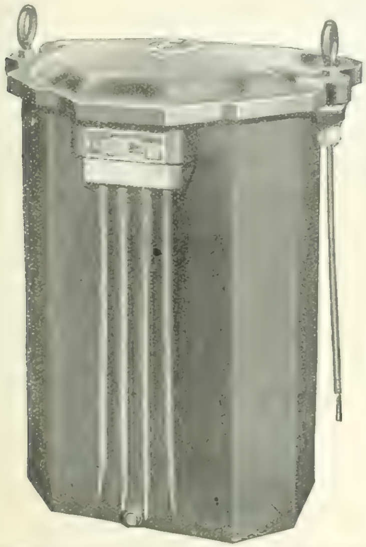
A 1250 Page Catalogue

The Canadian Westinghouse Co., Hamilton, have issued a very complete catalog of electrical supplies. The catalog is splendidly illustrated, well bound in stiff cloth covers, measures 8 in. by 11 in., and includes over 1250 pages Everything is included from a curling tongs to a 30,000 kv.a. turbo-generator. The catalog is carefully indexed as to sections. There is also a general index, alphabetically arranged, and a style number index is included in the appendix. The introductory pages give some inpressive facts about the Westinghouse organization, including details of their East Pittsburgh works, as well as plants at: South Philadelphia, Pa.; Newark, N.J.; Cleveland, Ohio; Trafford City, Pa.; Derry, Pa.; Bridgeport, Conn.; Mansfield, Ohio; Brooklyn, N.Y.; Bloomfield, N. J.; Milwaukee, Wis.; Trenton, N. J.; New York, N. Y.; Chicopee Falls, Mass., etc. Complete instructions, also, are given with reference to ordering goods.

Ferranti Company Under New Name

As stated in our last issue the Ferranti Meter & Transformer Manufacturing Co. Ltd., has been organized to take over the business of the Ferranti Electrical Co. of Canada Ltd. The business will be conducted as before, and carried on under the same management, namely: Geo. C. Royce, vice president and general manager; Fred W. Rowntree, secretary and assistant manager Joseph Showalter, engineer meter department; J. W. Chipperfield, engineer transformer department; A. Schofield, sales manager. The capital has been increased in order to provide for the equipment of an up-to-date factory, for the production of integrating watt hour meters, station and pole type transformers, instrument transformers, and a line of utility transformers, for the trade.

In addition to the manufacturing departments, the following agencies will be carried on: Ideal Electrical & Manufacturing Co., Mansfield, Ohio, Motors; Lewis & Roth Corporation, Philadelphia, Pa., disconnecting, switches, switchboard fittings and bus supports; Ferranti Limited, Hollinwood, Eng., switchboard instruments, heavy duty transformers and special meters; Ferguson, Pailin, Ltd., Manchester, Eng., switchboards, oil switches, etc. The company has recently designed a welded steel case to be used on all pole type transformers, as illustrated herewith. It is interesting to note that the company's new equipment enables them to manufacture all parts of their meters and transformers in their new factory at 26 Noble Street, Toronto, where business has already grown to such an extent that they propose building an extension.


S P Pole Type Transformer. Welded Steel Case and Cast Iron Cover

Current Consumption and Operating Costs

What does it cost to operate?

This question is one of the many the salesman of electrical appliances is called upon to answer. Generally speaking, the salesman should endeavor to convince his customer that the value of electrical appliances lies in their utility rather than in the cheapness of operation, but, nevertheless, the question will come up and when it does, the answer should be prompt and accurate.

Every salesman should know the current consumption, by heart, of every appliance and should be able to figure the cost of operation rapidly. For example, here is a list of approximations. The cost is figured on a basis of one cent per kilowatt hour, so that by simple multiplication, the cost at any other rate can be determined in a few seconds:

Article	Av. Consumption in watts	Cost per hr. Current 1c per kw.h.	No. hrs. [illegible]
Lamp	40	.04	25
Iron	500	.5	2
Curling Iron ...	40	.04	25
Bed Pad	60	.06	17
Percolator	400	.4	25
Toaster .	500	.5	2
Chafing Dish ...	500	.5	2
Grill	600	.6	1.7
Plate Warmer ...	300	.3	3.3
Milk Warmer...	250	.25	4
Soldering Iron ..	100	.1	10
Radiators	600	.6	1.7
Fireless Cookers.. ..	500	.5	2
Ranges	4000	4	

Where motors form part of the equipment, the capacity is measured in horse power. The cost is easily figured by remembering that one horse power is equal to 745 watts. For example, in the following list.

	Current Consumption	Consumption in watts	Cost per hr. at 1c per kw.h.
Washing Machine	1/8 to 1/4 h.p.	93 to 186	.093 to .186c
Dish Washer.. .	1/8 to 1/4 h.p.	93 to 186	.093 to .186c
Ironing Machine	1/8 to 1/4 h.p.	93 to 186	.093 to .186c
Vacuum Cleaner . .	1/12 to 1/6 h.p.	62 to 124	.062 to .124c

This list also points the moral that in these days of power shortage, at least so far as certain parts of Ontario are concerned, the logical course for the dealer is to concentrate on apparatus operated by motors, such as the washing machine, the dish washer and the vacuum cleaner. These items not only fit in with a limited power supply but they are among the most utilitarian, and at the same time yield the dealer a fair profit.

Canada's First Spark Plug Factory Opened

What is said to be Canada's first spark plug factory, that of the Champion Spark Plug Company, was recently opened at Windsor. The plant when in full operation will employ 150 persons, and be able to turn out plugs at the rate of 40,000 a day.

Mr. McCordick Goes with Moloney Electric

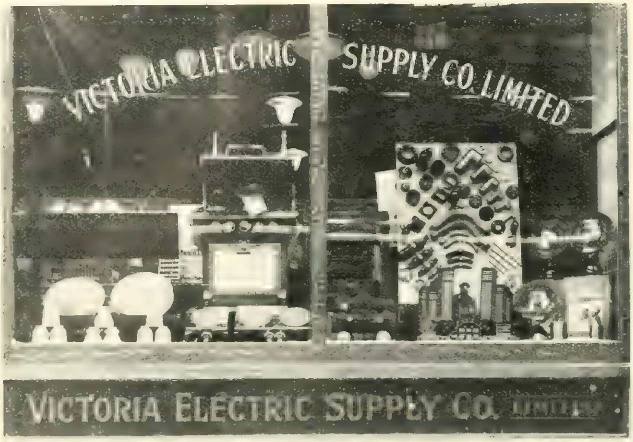
Mr. A. S. McCordick, who has been for several years connected with the Canadian General Electric Company, has recently severed his connection, and is now sales manager with the Moloney Electric Co. of Canada, Limited.

Messrs. Culley and Breay have been awarded the contract for the lighting and power installation in the Imperial Office Building, Hamilton.

The Abitibi Power Company are increasing their power development at Iroquois Falls, from twenty-eight thousand horse power to fifty-three thousand horse power.

The electors of Windsor, Ont., by 1,639 to 243, voted to acquire the electric lighting plant owned by the Windsor Street Railway Company.

After paying bond interest, the earnings of the Public Service Corporation of Quebec for last year totalled $77,862, compared with $66,621 in the previous year.


VICTORIA ELECTRIC SUPPLY CO. LIMITED
VICTORIA ELECTRIC SUPPLY CO. LIMITED

This is a very carefully arranged window display more especially suitable for a jobbing house. Sometimes the contractor-dealer makes the mistake of exhibiting items which do not in any way interest his customers. It is different with the jobber whose customers are the contractors and dealers themselves

A Well Balanced Window Display

A window display of more than passing interest is that of the Victoria Electric Supply Company, Limited, Craig Street West, Montreal. This store, situated on one of Montreal's busiest streets, tends to show the ever-increasing demand of the public for electric household appliances. One side of the window is made up with electric irons, heaters, and other household appliances, the other side with articles to fill the contractor's needs. A novel feature in the construction of the store is the window, which is built about five feet above the level of the sidewalk, showing off the contents to excellent advantage. The extreme left of the window has been devoted more or less to lighting, great prominence being given to the indirect lighting reflection. In the centre, different electric heating and cooking appliances are seen. On the right, we have condulets, fuses, elbows, and other articles, suited to the contractors' needs, attractively arranged. A special feature of the window is the electric plate for cooking purposes. This is made on the same plan as a gas plate, and found to be just as, if not more, efficient.

A Manufacturer's View

Editor, Electrical News,

As manufacturers of electrical appliances used throughout the length and breadth of Ontario, we have been very much surprised at the statements made by Mr. Goodwin at the electrical convention held in Toronto on January 16th. We are greatly pleased to see that your good publication took exception to these statements, and referred to them as "Goodwin's Humor". It is a surprising thing to us, as manufacturers of up-to-date electrical appliances which have not only proven a success to ourselves as manufacturers, but a benefit to the entire country, to say nothing of the contractors themselves, that Mr. Goodwin should at such a time, create an unfavorable impression and cause adverse newspaper notices to appear, detrimental to the interests of the Inspection Department.

We have watched the growth of the Ontario Inspection Department, and feel it is about time that the Contractors' Association made some concerted move to strengthen the hand of the Department which has done so much for them, and [illegible] many of whom were present at this convention, that Mr. Goodwin's statements are misleading

Yours very truly,

Manufacturer.

Shawinigan Had Good Year

The profit and loss account of the Shawinigan Water and Power Company shows a surplus of $30,550 to be carried into the coming year as compared with $17,710 in 1918, and $30,145 in 1917. Total revenue from all sources amounted to $3,727,045 as compared with $3,621,074 in 1918, and $2,902,210 in 1917. After deducting operating and allied charges, a balance was left amounting to $2,430,858, as against $2,335,053 in 1918, and $2,149,368 in 1917. The net earnings available for dividend amounted to $1,473,743, as compared with $1,410,094 in 1918, and $1,350,865 in 1917.

Mr. J. E. Aldred, the president, referring at the annual meeting to the company's physical position, said that of its plants, machinery, and water power development, their replacement value would be about $20,000,000 at the time they were installed, while to-day they could not be replaced for less than $40,000,000 .

Speaking of the company's power situation, Mr. Aldred summarized the developments as follows: 333,700 horse power of electrical and hydraulic development now installed at Shawinigan Falls and at the Laurentide Power Company, Limited. There may be added in the future 100,000 horse power at Shawinigan Falls, 60,000 horse power at Laurentide Power, and 150,000 horse power at Gres Falls, thus making a total of 643,700 horse power. This would represent more power than is grouped in any other one place in the world.

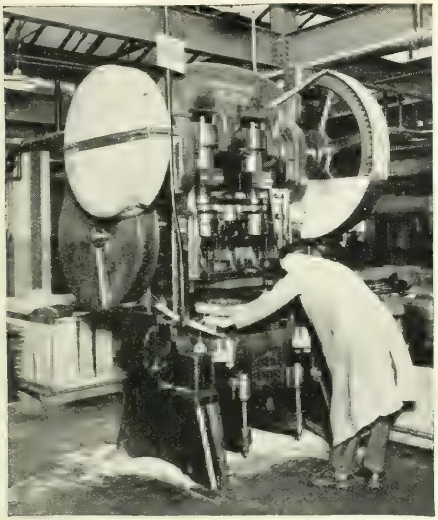
After pointing out that Shawinigan has now 2,872 shareholders in all, he referred to the small amount of construction work, owing to high costs.

During the year 1919 additional power contracts were made to the extent of 25,000 horse power. The most important new contract was that made with the St. Maurice Lumber Company, a subsidiary of the International Paper Company.

An electrically operated clock will be installed in the city hall tower at Welland, Ont.

An Effective Safety Device used on Machines also Making a Safety Device

The accompanying illustration shows a motor operated side press in use in the machine shop of the Square D Company, Detroit, Michigan, which is provided with an effective safety device for protecting the hands of the operator. The press is actuated by a tread or lever which throws the clutch. Without the safety device, the operator while operating the press with his right hand, may unconsciously fail to remove his right hand from the metal he has placed on the die and thus lose his fingers or perhaps his entire hand when the press closes. To prevent this inadvertency a lever is provided also for the left hand. This is connected in the rear of the press to the right-hand lever by the means of a rod. Both levers, right and left handed, must be held down at once to throw the clutch. To press but one only raises the opposite lever and allows the clutch to slip. The operator is compelled to keeep both hands out of danger in order to operate the press. Curiously, this side press stamps, presses perforates and fashions sheet-steel into boxes which are used to enclose the live parts of electric switches—a protective device for household and industrial users of electric current. The switch is also shown in the illustration.



Laco Lamps Soon

The Canadian Laco-Philips Company, Limited announce as a result of a number of months negotiations with the Canadian General Electric Company, Limited, that they have taken out a license to make incandescent lamps under all their existing lamp patents. The license is a particularly valuable one, based as it is on patents that correspond to patents which have been litigated and upheld in other countries, and where upheld, are governing the sale of both vacuum and gas-filled types of lamps. The Canadian Laco-Phillips interests will organize a new company, and are arranging to have the stock largely in the hands of Canadian electrical interests in different parts of Canada, and will continue to have, as heretofore, a Dominion-wide distribution of lamps under the trade-name Laco. The Canadian Laco-Phillips Company also expect to make arrangements to take over one of the existing lamp companies of Canada, so that the manufacture in Canada of Laco lamps will be very shortly commenced

Hamilton Electrical Association

The annual meeting of the Hamilton District Electrical Association was held in the Royal Connaught Hotel on Thursday February 5. Mr. V. K. Stalford, president, occupied the chair, and conducted the election of officers. The reports for the past year were received. R. M. Dewhurst, the newly elected president, in his address, outlined the policies and the work to be carried on by the association during the coming year. The next meeting of the association will be in the form of a social get-together night for the members and their friends.

The new officers are: R. M. Dewhurst, president; J. M. Moncur, vice-president; J. Culley, secretary; E. A. Wark, treasurer; W. C. Reid, E. S. Jefferies, L. H, Lander, councillors; L. H. Lander, Chairman of the Contractors' Section.

Instantaneous Cell Tester

The illustration herewith shows the "Hyrate" Cell Tester, manufactured by the Service Station Supply Co., Detroit, Mich. This is an instantaneous indicating instrument for storage batteries of all makes and sizes. In a few seconds you can test every new, rental or recharged battery and determine its condition. The tester consists of two hex special steel prods, three inches apart at the points. A special nickel-chromium resistance of .01 ohm connects the prods and, suspended on props between the prods, there is located a voltmeter with 2-0-2 volt scale. The nickel chromium resistance varies imperceptibly with temperature changes and will not oxidize or rust. The voltmeter is of the moving coil type, accurate and dead beat.

Owing to the smaller demand for power, due to the termination of the war, the gross revenue of the Laurentide Power Company decreased $18,000 in 1919. After payment of the bond interest and dividends, there was a deficit of $142,614, reducing the surplus to $19,806. The president states that the financial conditions of the company subsequent to July 1st, 1920, will be excellent, due to the increasing revenue which becomes effective on that date.

New Sales Manager for Monarch Electric Co.

Mr. Howard W. Fairlie has been appointed sales manager of the Monarch Electric Co. Ltd., St. Lambert District, Montreal, P. Q., manufacturers of power switch gear, protetcive and wiring devices For the past eight years Mr. Fairlie has been with the Northern Electric Co. on sales work. He first was engaged in the sale of telephone train despatching equipment and afterwards was in charge of the sale of power apparatus in the Montreal District. During 1914 and part of 1915 he was district sales manager at Winnipeg and since that time has been in the general sales department at Montreal in connection with the sale of wires and cables especially for export. Prior to going with the Northern Electric Co. he had been associated with several concerns in the sale of mechanical and electrical products.

Mr. H. W. Fairlie

The Monarch Electrical Co. was organized in 1907 and has been manufacturing the more widely used wiring devices for a number of Canadian distributors. They have also been producing switch gear and protective power devices for a number of the larger power and industrial concerns in Canada. These in many cases have involved special engineering and manufacturing attention to meet out-of-the-ordinary operating conditions. They now expect to maintain a closer acquaintance with their representatives and customers and at the same time make the general Canadian Trade more familiar with their products.

A contract has been awarded to the Packard Electric Company, St. Catharines, Ont., for 6 1,000 kv.a. single phase transformers for the Winnipeg Light and Power Department.

It is stated that the Marconi Wireless Telegraph Company of Canada will build a $2,000,000 radio station close to Vancouver for the transmission of business to the Orient.

A new firm under the name of R. E. Callahan, Limited, will commence business in Toronto, for the manufacture and sale of electrical household appliances.

By a vote of 225 to 131 the ratepayers of West Flamboro, Ont.., rejected the Hydro Radial By-law.

A new electric light and power plant has just been completed at Lloydminster, Sask.

Current News and Notes

Fredericton, N. B.

Fredericton City council recently decided to send Ald. Burpee and City Engineer McDowell to Halifax, to inspect generators and other machinery available for purchase. This will be for the street lighting plant at Carleton Street Station. The cost of alterations will be approximately $7,600.

Guelph, Ont.

The Cataract Power Company of Orangeville, Ont., have offered to sell to the City of Guelph all power additional to their own needs, at the rate of $18 per h.p. flat for twenty four hours. This additional power amounts to between 3000 and 4000 h.p.

Kincardine, Ont.

Kincardine ratepayers are to vote on a by-law to provide $40,000 for Hydro-electric construction purposes.

Montreal, Que.

The Canadian Electric Steel, Limited, has been incorporated as a company to construct and maintain water powers for the production of electricity. The headquarters of this company are in Montreal

Nokomis, Sask.

The town of Nokomis, Sask., is installing an electric plant. The equipment consists of 15 h.p. horizontal oil engine direct connected through flexible coupling to a 9 k.w. direct current generator, and a 25 h.p. horizontal oil engine, direct connected to a 15 k.w. generator. This equipment is being supplied by the Canadian Fairbanks-Morse Company.

Orillia, Ont.

The Orillia Water, Light & Power Commission, R. H. Starr, engineer, are preparing to rebuild their No. 2 transmission line to run a 2200-volt line from Longford to Geneva, and a further half-mile extension outside the town limits.

Cttawa, Ont.

It has been decided upon to lay 400 miles of telephone through the forests of the upper Ottawa River. Two hundred miles of this will be proceeded with at once. It is part of the scheme of the River Forest Protective Association.

Toronto, Ont.

There have been no replies to the call for tenders, for the construction of the Mt Pleasant car line in North Toronto.

The Board of Control have approved the tender forms submitted by the Works Commissioner for 13 double-truck double end cars for the civic lines.

A new manufacturing company has been formed in Toronto under the name of the "Apex Electrical Manufacturing Company, Limited."

Vancouver, B. C.

Canton, China, with its 2,000,000 population, without a tramway system, is to have a modern street car system Judge Peter Hing, M.A., B.C.L., honor graduate of the McGill University, and formerly Chinese resident here, arrived on the Empress of Asia to place orders with Canadian and United States firms for the necessary equipment.

Windsor, Ont.

The hydro-electric system at Windsor is growing so rapidly that extensions in lines and sub-station equipment have become necessary. The local commission has decided to ask the city council to prepare and sell debentures to the amount of $150,000.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 309 Broadway
CHICAGO - - - 1413 Gt. Northern Bldg.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, March 15, 1920 No. 6

Too Low Prices for Electric Current in Ontario

The Toronto & Niagara Power Company, which recently took over the Toronto Electric Light Company, has now announced an increase in rates varying in amount up to around forty per cent. This has been brought about partly, of course, by the greatly increased cost of providing service, but partly, also, no doubt, by the fact of the great shortage of supply on the lines of the competing organization—the Toronto Hydro-electric System. During the past few weeks it is an open secret that the Hydro, all over the province, has been unable to anything like meet the demand and this has meant that wherever there was an alternate source of supply, there have been many changeovers. The Toronto & Niagara Power Company were in the position, fortunately for themselves as well as for some of the citizens of Toronto, who were unable to get service from the Hydro, to take on a number of new customers. It goes without saying that they would accept only the cream of what offered and that they are now able to ask much higher prices without fear of losing their customers.

This is not intended to reflect in any way on either the policy of the Toronto Hydro or of the Toronto & Niagara Power Co. Both of these organizations find themselves surrounded by conditions that are not of their own making. It is a peculiar enough outcome of the Ontario Hydro policy, however, to be worthy of comment, that the low prices instituted by the Ontario Commission have created a demand they are not able to meet, which, in turn, has forced an increase in prices. It would seem, indeed, as if the matter of price cutting had been a little overdone and is now reacting on the province to the detriment of the general industrial condition.

The troubles of the past winter in Ontario seem to point to certain conclusions. First, either we must stand still industrially, or second, greatly increase the power supply in some way during this summer, or third, encounter much worse conditions of power shortage next winter than ever. Another point has surely been emphasized during the recent shortage, viz., that price is not a prime consideration, especially with large power users. They value continuity of service much more highly.

Abatement of Smoke Nuisance by Electrical Process

The abatement of the "smoke nuisance," whether from industrial plants in large cities, or smelters and similar industries in more or less isolated districts, is a problem that is almost as old as the industries themselves, yet, like many other problems, it is being solved electrically.

The Cottrell electrical precipitation of noxious fumes, objectionable smoke, etc., is a process which, stripped of its engineering technicalities, holds no small degree of interest for the general reader. The basic theory of operation of this electrical process is simply that any insulated body coming between an electrically charged point and an oppositly charged plate, receives the same electrical charge as the point, and since like charges repel, the body is thrown to the plate. This is also true of the particles of invisible gases, as is proved by the old physical experiment of blowing out a candle flame by putting it between a charged needle and a smooth, charged plate. In its simplest form, the Cottrell apparatus consists of a metal pipe or flue, through which the gas to be cleaned passes, connected to one side of a high voltage direct current circuit, and a wire along the axis of the pipe, which is connected to the other side of the same circuit.

Since it is not practical to generate direct current at the high voltages—between 100,000 and 125,000 volts—demanded by this process, the electricity is generated as alternating current and rectified into direct before reaching the flue.

What happens is simply that the small particles of fume and smoke which are held in suspension by the gas passing through the flue, receives the same charge as the wire and are either attracted to the pipe and held there, or are attracted to each other, forming masses which are heavy enough to fall by gravity to the hoppers underneath. The pipes are relieved of their load by being periodically beaten with hammers, either electrically or by the hand.

This process will not precipitate pure gases, but many chemicals which are in a gaseous state at high temperatures are either liquids or solids when sufficiently cooled. The can then be removed by the Cottrell process, as is actually done with arsenic in a western smelter, whereby large amounts of this valuable element are recovered in a high state of purity. A large cement plant recovers many tons of potash dust per day, which was hitherto pure loss, but which now can be sold for fertilizer at almost as good a price as the cement itself.

In fact this process is applicable to all sorts of industries, such as smelters, blast-furnaces, and chemical plants, and is used for the removal of the objectionable features from the smoke of incompletely burned oil and coal. Before its development, many smelters in the west were forced to shut down by the government because their fumes were destroying the vegetation for some distance around them. This Cottrell process has proved valuable, not only in abating smoke nuisances, but in recovering valuable materials that have hitherto gone up in smoke, and been completely wasted.

Group Insurance Given to Employees

An insurance policy for the sum of five hundred dollars ($500.00) will be given entirely without cost to every employee of the Westinghouse Electric & Manufacturing Company who has been in the service of the company for a period of six months or more, according to a statement made by one of the officials of the company. The plan was effective March 1. In addition, the employees, after April 1, may increase the value of their policies to amounts varying from $1000 to $2000, depending upon their length of service and continuity of savings. All employees who have been in the company's service for six months or longer and who deposit a sum each pay day in the Employees' Savings Fund, equal to 2 per cent. or more of their earnings, will not only receive 4½ per cent. interest compounded semi-annually on such deposits but in addition will automatically have their insurance increased to amounts up to $2000, depending on the length of time they have been with the company. For example, a man who has been in the service of the company for 15 years and has regularly deposited in the Employees' Savings Fund 2 per cent. or more of his salary, on which he regularly receives 4½ per cent. compound interest, is presented with an insurance policy in one of the established companies for the sum of $2000, at no cost whatever to him. After an employee has maintained the required deposits for a period of five years he may discontinue or withdraw his deposits from the savings fund without in any way affecting the value of his insurance policy. In order to provide for cases where employees need some money and do not wish to disturb their savings and thus affect the value of their insurance policy, loans will be made by the company to the extent of 90 per cent. of the amount to the credit of the employee in the savings fund without in any way affecting the value of the insurance. This insurance is made effective at all of the various offices and plants of the Westinghouse Electric Company and will affect approximately 50,000 people.

Preventing Formation for Frazil

A private demonstration of the formation of frazil and anchor ice was given by Mr. John Murphy, a few days ago, in the head office of the Toronto and Niagara Power Company, 10 Adelaide St. E., Toronto. Mr. Murphy showed a moving picture of a series of experiments he had carried out recently, which go to prove that ice will not form around solid particles if the temperature of those solids can be kept merely an infinitesimal part of a degree above the freezing point. The demonstration showed water unfrozen, several degrees below 32° F., but as soon as it was disturbed or shaken, particles of ice began to form immediately. An iron rod used to stir the water under these conditions gathered ice rapidly. If, however, the temperature of the rod were kept a fraction of a degree above the freezing point, no ice formed on it.

The practical application of the experiment is that frazil ice may be prevented from forming on the racks at the entrance to power plants, if these racks are only slightly warmed. Mr. Murphy is of the opinion that the facts brought out in his demonstration are capable of very practical application to prevent ice troubles.

W. H. Banfield & Sons, Toronto, have issued a new blue list effective March 1.

Electrical Pages in Daily Press

Ever since the recent big convention of electrical men in Toronto, the Toronto Globe has been carrying, one day each week, an "Electrical Page." This is made up partly of advertisements and partly of reading matter of educative value and interest to the general householder. This page is undoubtedly of great value to the industry as a whole, and if the convention did nothing else than start this one idea, it has justified all the time and money that was spent on it.

It is indicative also of the activity of the industry at the Coast, that the Vancouver World has taken up the same idea. Judging by the first sample of this electrical page that has come to our notice, the demand for advertising space was so insistent as to leave practically no space for reading matter. This is a mistake and it is to be hoped will be remedied in future issues. There is much educative work to be done yet and it is evidently the function of such a page to supply it. We would suggest that the advertisers make it a part of their contract that the page should contain a certain percentage, say 40 or 50 per cent. of interesting and authoritative reading articles dealing with electrical matters.

The Oil-Electric Propelled Yacht "Elfay"

The yacht Elfay—claimed to be the first in the world to be driven by the Diesel electric system of propulsion—left New London January 15th for Cuba, Bermuda, and other southern ports. This interesting little vessel was built by Herreshoff in 1914. She is essentially a sailing schooner, 152 ft. over all, 30 ft. beam, and 313 tons gross. Her present owner, desiring to install auxiliary propelling apparatus, decided on the most modern variety. Her propelling equipment consists of a 6-cylinder 115 h.p. model 54 Winton Diesel oil engine direct-connected to a 75 kw. Westinghouse generator. This supplies power to a 90 h.p. Westinghouse motor, of 360 r.p.m. which is directly connected to the propellor. All of the auxiliary equipment of the Elfay is electrically operated, including the winches, pumps, fans, blowers, ice machines, etc. She is also electrically heated, but cooking is done by an oil range supplied with electrically pumped oil. The Elfay will depend mainly on her sails but she has a cruising radius of 2000 miles on her motor drive, since she can carry 2400 gallons of fuel oil and consumes 7½ gallons per hour. Her speed at the full power of the motor is 8½ knots.

Montreal Weekly Luncheon

"Electrical appliances and the part they played in winning the war" was the subject of an address given by Colonel H. C. Walklem before the members of the Montreal Weekly Electrical Luncheon, on March 3rd. Colonel Walklem described the lighting system installed in the tunnel approaches to Vimy Ridge, also the electric appliances used in warming blankets for the wounded. Electricity, he stated, had also played an important part in the biggest gas attack of the war, in which fifteen hundred drums of liquid gas had been fired simultaneously from trench mortars by means of electricity.

Electric Branding

Packing houses are now adopting electrically-heated branding irons for stamping their trade marks upon carcasses. The introduction of this device has proved a tremendous time-saver, one man now being able to accomplish the work of from four to six in the same time. The same device may also be adapted for burning brands upon packing cases.

A Modern Electrical Precipitation Plant for Silver Refinery Fumes

The electrical system of precipitatng fine articles is now used to eliminate smoke, fumes and dust in a variety of industries, but it is especially useful in connection with metal refineries, because of the high value of the materials recovered. An installation has recently been made in the Silver refinery of the United States Metals Refining Company, Chrome, N. J., which is of special interest, because it represents both a successful commercial installation and an advanced development of precipitating apparatus for this kind of service.

Installations of this type present many engineering difficulties, for not only must practically 100 per cent. of the fumes be recovered, since every particle escaping represents a financial loss, but the material precipitated in the tubes is particularly troublesome. This substance is not a fine, dry, easily-handled dust, as is the case with cement kiln fumes, for example, but a semi-liquid sludge, that is hard to remove, and is especially liable to build up on the electrodes and cause grounds. It also contains a considerable percentage of selenium compounds, which not only attack iron and steel, but ordinary commercial lead also, and only lead free from antimony can withstand destruction from the selenium-carrying gases. Hence, every part of the equipment with which the fumes come in contact must be covered with chemically pure lead.

The nature of this heating process is generally known; it consists of passing the dust and fume-laden gases through long pipes. In the centre of each pipe is suspended an electrode charged with uni-directional current of a very high potential (in this case 65,000 volts). The solid and liquid particles become electrified in passing through the strong electrostatic field and are attracted to the walls of the pipes, which are grounded.

The treater installation is supported on a structural steel frame-work and consists of three units of thirty lead-lined tubes each. The electrode system, contained in the tubes is rigidly suspended from the top, so that bottom insulators can be dispensed with.

The gases from the furnaces are first passed through scrubbers and sprayers, which remove a portion of the fumes and cool and moisten the gases to the proper degree. They then pass into the top of a large header, into which the precipitating tubes project several feet, so that irregularities in the gas flow are broken up, all the pipes are heated the same temperature, and a uniform flow is established through each pipe. After passing through the pipes, the gases now free from fumes, escape into the atmosphere.

As soon as the maximum permissible amount of precipitation has taken place in the pipes of any unit, the gas flow and the electric current to that unit are cut off, and the precipitate is flushed out of the pipes by a washing system.

Electrical Equipment

The electrical equipment which produces the high-voltare direct-current, consists of a motor-generator set, a high voltage transformer, and a mechanical rectifier.

The motor-generator set is made up of a 40 h.p. 220-volt Westinghouse direct-current motor, and a 25 kv.a., 220 volt, 60 cycle Westinghouse alternating-current generator. The motor is driven from the power circuit of the plant and the generator supplies the current for the precipitation system.

The low-voltage current from the generator goes to the transformer, which is of a special design made by the Westinghouse Company. It is of 25 kv.a. capacity; takes low voltage current at 220 volts, and has taps in the low tension winding for transforming the current to 55,000, 65,000, 70,000 and 75,000 volts, respectively.

After the low-voltage alternating current has been transformed to high-voltage it goes to the mechanical rectifier, which is a simple form of commutator and is kept in synchronism with the current by being mounted on the generator shaft, changing the high-voltage alternating current into uni-directional current of slightly lower voltage. The high voltage uni-directional current then goes to the treater.

Diseases of Electric Batteries and Their Simplest Remedies

By Mr H. S. Brown

Most diseases in lead cells are the result of failure on the part of those using them to observe the instructions usually supplied by the manufacturer.

The principal diseases are: Loss of capacity, corrosion of plates, fracture and buckling, shedding of active material, sulphation, reversal of negative plates, internal discharge, hardening of negatives in air and loss of voltage.

Loss of capacity may arise from clogging of pores of the negative with sulphate of impurities, contraction of the pores of the mass; loss of active material from the grid; formation of a layer of sulphate between the grid and the active material; loss of electrolyte.

If the negative plate loses capacity and does not show signs of sulphation or loss of material it will probably be found that the material has shrunk, or the pores are clogged with sulphate and impurities. Such plates can be rejuvenated by reversal of charge either by removing them from the cell or reversing the complete cell. This reversal must be carried out with exetreme care by an expert or the plates are liable to be destroyed in the operation. This danger applies articularly to the positive plates when the complete cell is reversed.

Evaporation of the water from the electrolyte should be compensated by proper addition of pure, distilled water, as otherwise a part of the plate not covered is inactive and the capacity proportionately reduced.

Corrosion of plates usually occurs from impurities in the electrolyte. The remedy is to charge the battery till the specific gravity ceases to rise, then drain off the electrolyte and replace it with fresh electrolyte free from impurities.

Buckling and cracking are the results of unequal or excessive expansion, usually the former. They indicate that the discharge has been carried too far, the rate of charge and discharge has been too rapid, or that the current distribution over the plate has not been uniform. In some types of positive plates a very low charging rate will cause buckling.

Buckling on discharge rarely takes place. It might occur on very rapid rates of discharge due to a slight inequality of distribution of active material, together with differences in electrolyte densities occurring at different levels of deep tanks. Discharges at high temperatures may also cause buckling, as at high temperatures cell capacity is increased and, consequently additional expansion of the active material due to formation of sulphate.

Buckling of plates exposed to light has been observed. This distortion is yet not definitely explained, but it is probably due to the fact that the side of the plate exposed to the light becomes warmer than the other. This would make the warm side deliver a greater amount of energy on discharge, resulting in unequal expansion of the active material and consequent plate backing.

Loss of some active material cannot be prevented. This is due to the expansion and contraction, which the grid cannot follow, or to the rapid release of gases when charging is done at high rates or the plates are over-charged.

To prevent excessive loss of active material, charge at normal or below (down to say 1/2 normal rates), do not overcharge; do not discharge too far, say below 1.8 volts, and do not charge long after gassing begins except about once a month.

Injurious sulphation is almost irreducible, causes loss of active material, buckling, loss of capacity and efficiency, and increase of temperature. It is caused by overdischarge or standing discharged.

Over discharges may occur intentionally, or otherwise, through external circuit; due to local action and leakage; loosening of active material, which reduces the capacity of the plate and normal discharge therefore overdischarges it, or short circuits between plates.

Short circuits can be prevented to a large extent by keeping the cells clean and not allowing the sediment to accumulate in the bottom or between the plates on the separators. Separators and spacing of the plates should be given occasional inspection and attention.

Solving the Ever Increasing Cost of Central Station Operation*

The ever increasing cost of operation of our public utilities since 1914 has become a serious menace to our country. While the demands for service made upon this industry are ever increasing, which demands must be met to assure industrial prosperity, the earnings of our central stations have declined at an alarming rate, making it most difficult to secure the necessary capital not only to make the necessary extensions and improvements, but, in some cases even to maintain the present service at a high point of efficiency.

It is true, that rate increases have been granted, but these have been far from adequate and great credit must be given to our utilities for the manner in which these properties have been operated to obtain the maximum efficiency in every department.

The largest items entering into the cost of operation are, of course, fuel, labor, and new equipment. Fuel and labor have practically doubled since 1914, whereas, equipment has increased anywhere from 50 to several hundred per cent.

In the boiler room of the power plant everything possible has been done to increase the amount of steam obtained from a pound of coal by the installation of stokers, economizers, draft regulators, flue analysis, machines, etc., and the results have been gratifying indeed.

In the turbine room more efficient machines have, where possible, replaced less efficient apparatus. Water conditions have been bettered to obtain better vacuums, great care has been exercised to operate the most economical combination of generating units for every combination of load. Coal and ash handling apparatus has been installed. In fact, plant operators have made every effort to increase the over all efficiency of this part of the industry.

The distribution and transmission systems received every attention; voltages have been raised, transformers redistributed, and other changes made, and the losses of transmission and distribution have been reduced.

The third item, namely, the cost of new equipment, and, of course, all repair parts are beyond the control of the operator.

It is, therefore, apparent that not much can be hoped for from these departments to relieve the situation. However, relief may be obtained by increasing the load factor of the entire system, inasmuch as the average central station is operating with an annual load factor of between 50 and 60 per cent., and, in many cases even lower than this. This fact, has, of course, been recognized and has resulted in considerable inter-connection of properties to take advantage of the diversity factor.

It is apparent that a plant and distribution system operating at 50 per cent. annual load factor would very materially reduce its operating ratio and thereby increase its earnings for every per cent. that its load factor could be raised.

In other words, if a system operating at 50 per cent. annual load factor, showed a cost of generating and distributing energy, including fixed charges of 1½ cents per kw.h., with an average fuel consumption of 2½ pounds of coal costing $4.00 per ton delivered; the cost of energy delivered, operating at 60 per cent. annual load factor would only be 1.34c per kw.h., as the only increase in expenses would be the additional cost of fuel and fuel handling.

This decrease is figured on a plant at 60 per cent. load factor, consuming the same amount of coal per kw.h., namely, 2½ pounds, as it would at the 50 per cent. load factor, whereas, of course, the coal consumption would drop, due to the fact, that the turbines would operate at nearer maximum rating for 24 hours, boilers would then require less banking and the ratio of power used by the station auxiliaries to the total power generated would be less.

Of course, the rate charged by the central stations is based on load factor; however, a careful analysis will show the great effect which several extremely high load factor customers would have on the total operating costs of a plant, reducing the cost of all energy generated.

The new business department of the Central Station should, therefore, be keen indeed to secure new business having high load factor, and, if possible, of course, high power factor, as this class of business should not be merely considered as an increase of so much per year in revenue, but should be considered as a reducing agent for the present operating cost, effecting materially the net earnings.

Such desirable business includes primarily electric ovens and furnaces of most types, but the resistance type of electric furnaces which operates 100 per cent. load factor and unity power factor, is the most desirable business that can be secured, giving a greater income per kv.a. of station and line capacity, even when considering the lower rate earned, than any other class of business and, of course, raising the load factor of the entire system and decreasing the present cost of operation.

Electric Welding—Extracts from Address Before Canadian Railway Club

By Mr. W. H. Ludington

During the last twenty-five years there has been developed a number of processes for the joining of metal parts. I refer particularly to Thermit, electric and oxy-acetylene processes. In the earlier stages of the development of these processes it was commonly believed by the metal trades that each of these processes was competing for the same field, and even to-day it is surprising the number of men indirectly or directly interested in the metal trades who still are of that opinion. Upon second thought it is quite obvious that if any one of these processes was adaptable to the entire field of welding, that process would have been developed at the expense of the other two, assuming of course that it would have covered the field adequately. Generally speaking, each of these processes has a field to which it is best suited, but it is to be expected that these fields will overlap in cases.

It is only to be expected that in the early days the manufacturers of the apparatus used in connection with each of the three processes claimed as large a field as possible for the use of their apparatus, and here let me point out that in the early stages it would have been impossible to have defined these fields, as the commercial interests behind the development were never certain that their particular apparatus had reached its full development; in fact, the same is true to-day, and by the introduction of a little ingenuity new fields for each process are opened daily.

---

*By Mr. R. I. [illegible], Sales Manager, the Electric Furnace Co.

The electric welding field is one of steel and iron only. It is not possible to successfully weld cast iron by the electric welding process; by this I mean occasionally there are freak cast iron jobs that can be electric welded. This is helped in some cases by cutting open the frame and drilling and tapping in steel studs, and then lacing over with electric welding. The result in cast iron is a perfect line of slag between the added metal and the stock on which the weld is placed.

In steel and iron the field is boiler or tank repairs. The advantage of electric welding over oxy-acetylene in this field is that the largest portion of the work resulting from wear on boilers or tanks occurs in the seams or those parts that have riveted construction. As the electric welding heat is so concentrated, it is possible to place a weld close to rivets without disturbing the rivets in any way; in fact, a heavy weld can be built up on a seam without the plate becoming red hot. To do this by oxy-acetylene would mean a large area of the plate would become white-hot, a smaller area red hot, and we would have the rivet shanks heated up, the diameter of the rivet holes would become smaller owing to expansion, the rivet shanks would be squeezed out of the holes, and it would be impossible to permanently make these rivets tight without replacing them. The electric welding, therefore, has an enormous advantage over oxy-acetylene on this class of work. It also has a field in building up steel shafting that has become worn in the bearings. The method used is to add sufficient metal so that the shaft can be turned down to full size of the original bearing.

General

The practical application of oxy-acetylene and electric welding processes in the field of manufacture is to replace riveting and other methods of making joints, and also in repair work under conditions where the older processes would have been wholly inadequate.

The rapidity with which the joints can be made in many manufactured articles and the comparatively high efficiency of the weld make it of great importance. For instance, in repair work it has made possible the saving of many parts which would otherwise have been scrapped, such as automobile crank cases and some special applications are found in the reclaiming of cracked castings in the foundries, the filling of blow holes in castings, the adding of material to worn surfaces to secure the original thickness, the welding of pipe without removal, the fillng of drilled holes that had been incorrectly located, and the sealing of riveted seams to secure absolutely tight joints which cannot be done effectively by caulking. In general the more recent welding processes are used for producing reliable points in thousands of manufactured articles which were formerly brazed, riveted or bolted together. In many fields the method has revolutionized past methods with corresponding decrease in labor and cost of production.

Direct telephone communication was opened up between Montreal and Winnipeg on March 3rd, when Mr. L. B. McFarlane, president of the Bell Telephone Company, Montreal, spoke with his son, Mr. H. B. McFarlane, in Winnipeg. The Montreal-Winnipeg call is routed through New York, Chicago and Minneapolis without relay, and is made possible by the use of repeaters or amplifiers.

Advantages of Correction for Low Power Factor

By J A Burnett, A.M.E.I.C

The matter of correction for low power-factor is now to the fore. The various electrical power companies usually penalize a power user if his power-factor is much below .85 (100 being unity). This low power-factor is caused by an aggregation of induction motors being run at lower than full load for all or for part of the time.

Formerly it was considered good practice to install motors with a margin of capacity for future requirements. Unfortunately the low power-factors introduced have adversely affected the power companies' distributing systems, and have introduced wattless currents, detrimental to the voltage regulation of the system. The penalties may attain 10 per cent of the normal cost for the power and in most cases it will pay to correct and eliminate the penalty.

The following methods are available:

1. Installation of static condensers.—This device consists of an oil-immersed condenser, in a metal case, and controlled by an oil switch with no voltage release to absorb the condenser discharge. This method is now being extensively used in Great Britain and the United States, and has a promising future.
2. Installation of a synchronous motor and field over-excited, to draw leading current from the line, offsetting the lagging current due to the induction motors.
3. Installation of synchronous condenser as per (2) above.

The difference between a synchronous motor and a synchronous condenser, is that the first operates with a mechanical load and the second runs free.

A slight theoretical advantage is gained by installing a synchronous motor as compared with a synchronous condenser, but based on the practical experience of the writer, a synchronous condenser is preferable, as the hours of running may be varied to suit the amount of power-factor boosting required and, further, the set may be installed in a convenient spot in the engine or transformer room; space being sometimes lacking to permit a synchronous motor being installed in the owner's plant near the work.

A 100 kw. synchronous condenser, with a 5 kw. exciter and control panel was recently installed by the writer at the plant of the Consumers' Cordage Company, Limited, Montreal, with very satisfactory results.

For this purpose it is considered that a used alternator, carefully selected, is suitable. It is essential that the machine be provided with bridged field pole pieces, otherwise hunting will ensue and the condenser will kick itself out of step and the oil switch will open, shutting the machine down. It is found that 10 per cent. over the normal excitation will provide sufficient power-factor correction to raise an ordinary installation from say .60 to .85 or .90, and in this connection it is important that the exciter capacity be ample for the requirements. An approximate rule is to install an exciter of 5 per cent. in capacity of the condenser. The normal excitation for a 100 kw. condenser will be found to be under 25 amps. at 110 volts, or about 2.75 kw. At this exicitation the power-factor will be raised from .60 to .90 or more.

An approximate rule for the size of the synchronous condenser is that the rated capacity of the condenser be 25 per cent. of the installed motor capacity. This refers to comparatively small installations or up to 500 h.p.

As regards the starting up, it is found that most machines are self-starting, provided that 60 per cent. of normal volts be applied to the stator, and that the field of the condenser be shorted through a resistance so that the equal of approximately line volts are indicated at the field terminals. The field circuit must not be opened until the machine is up to speed and the current (a.c), in the fields, will attain about normal field excitation. A double pole, double throw switch then throws the field on to the exciter, which then delivers d.c. current to the condenser fields. The condenser quickly comes into synchronism and will remain so.

A typical installation will figure out somewhat as follows:

Annual power bill, with penalty..		$11,000.00
Annual power bill, without penalty......		9,500.00
Difference		$1,500.00
Cost for one 100 kw., used, synchronous condenser, 5 kw. exciter and control panel installed..	$3,000	
Interest, 6 per cent., maintenance 5 per cent., or 11 per cent. on above........	330	
Current to run condenser 10 h.p. at $35..	350	680.00
Net saving per annum		$820.00

Equal to 27.3 per cent. on the capital outlay.

Some Basic Facts About Types of Power Cables

A very comprehensive paper on "Power cables" was read by Mr. R. G. Harris, manager of the Standard Underground Cable Company, of Canada, Montreal, at the Montreal Electrical Luncheon Club. It was rather surprising, said Mr. Harris, at times to find electrical engineers well versed in all other details of their work, and yet were so ignorant of almost basic facts of power cables. No power system was stronger than its weakest part, and many plants were wrecked, or put out of business for a time by the breakdown of a power cable faulty either in construction or specification. An engineer in Montreal once said to the speaker, "A cable is only so much copper and paper and pitch and lead"—it would surprise him to know that in the speaker's associate American company they had an engineering corps of highly paid men exclusively studying the characteristics and improvements of this single class of products.

In tracing the manufacture of cables to accommodate increasing working voltages, Mr. Harris pointed out that his company were regularly making cables of 25,000 volts, and occasionally for somewhat higher voltage. Power cables were divided into two main classes: low voltage, those with working voltages of 7,500 volts or less, A. C. and E. C.; high voltage, those over 7,500 volts, all A.C. Power cables were also divided into three service classes. 1, Underground: Plain lead covered for installing in ducts or conduits; lead covered and double steel tape armoured for laying in trench directly in the ground; 2, Submarine; 3, Aerial. Referring to the submarine cable, Mr. Harris said, that in crossing points like narrow canals, double steel tape armour was sometimes employed for reasons of cheapness, but double steel tape armour had no longitudinal strength, and should only be used under special conditions, particularly in Canada where ice conditions were so bad.

Types of Power Cables

The usual type of power cables consisted of the following elements: 1. Conductor, almost universally in copper because of conductivity, solid or stranded, depending upon size, untinned except with rubber insulation. 2. Insulation, rubber, varnished cambric or paper, or combinations of either. 3. Covering: braided or lead covered. (Paper cable was always lead covered.) 4. Armouring: double steel tape or steel wire, galvanized or ungalvanized. The number of conductors varied according to the service, from single conductor, usually for O.C. service, to multi conductor for A. C. service. In single conductor cable, the conductor was always round; in multi conductor cable it was either round or sector shape. The size of the conductor was regulated by allowable voltage drop, allowable heating or I.^{2}R. loss, and allowable maximum stress in the insulation. There were three distinct types of insulation used, and each fitted for its peculiar service—rubber, varnished cambric, and paper. The first named was largely used on low voltage cables, particularly where handled by relatively inexperienced labour; it was inferior for higher voltages, because of the uncertainty of the complete vulcanization or exactly uniform vulcanization of each layer on very thick insulations. Varnished cambric had been used for about 12 years, and was much used for inside station service, in braided or leaded form, and where experienced cable men were not available. By far the vast majority of power cables were made with paper insulation; its cheapness, adaptability to all voltages, and low dielectric losses with proper saturating or impregnating oil compound, making it very popular.

Energy Losses

Mr. Harris then discussed energy losses in cables, which he said were made up of losses in the conductor due to low current and losses in the dielectric or insulation due to electric stress in the insulation. With direct current the former was the only one of importance, but with A. C., particularly at high voltages, the dielectric loss became considerable. Dielectric losses were of three kinds: (1.) Dielectric hysteresis, or the energy loss in the insulation due to the condenser characteristic of the cable, analgous to hysteresis loss in iron. This loss varied as the square of the voltage roughly. (2) Losses due to actual conduction of current through the insulation, due to its not being a perfect insulation. (3) Internal corona or ionization, or the electric discharge which took place within small minute air or gas bubbles that existed in a greater or less degree in practically all types of solid insulation when these bubbles were subject to too high electrical stress. The basic requirement of all cable insulations was to insure proper cooling conditions, or ability for the heat generated to be rapidly dissipated, and in this connection, M. Harris emphasized the importance of getting installation conditions as nearly perfect as possible for successful operation, and to be sure that the estimated carrying capacity took into consideration all surrounding conditions. Too many engineers disregarded these contingent conditions, and expected a cable to stand up under most adverse circumstances, although they would go to excess to make the conditions ideal for their more rugged transformers and generators, disregarding the fact that the cables were just as susceptible to adverse operating conditions, if not more so than other equipment, and usually were located where they could not be observed or watched for any heating under operation.

Mr. Harris then discussed two new types of cable-split conductor cable, exclusively used on main trunk, high tension cables, and for the purpose of indicating any deterioration in the cable insulation at any time; and the Standard type "H" cable, the latter being a patented form of cable for which several advantages were claimed. Referring to the installation of cables, Mr. Harris said cables should never be installed in temperatures of zero or less unless extraordinary means were taken for their protection.

Electrification and Power Developments for Steam Trunk Lines in Canada

By Walter P. Chapman, M.E.I.C.

The very successful electrification of 640 miles of the Chicago, Milwaukee and St. Paul Railway reveals an era of marked progress, brought about by scientific research, in the application of electrical energy for the use of man.

The purpose of this article is to deal with electrification of the Temiskaming and Northern Ontario Railway. A government-owned railway, operating between North Bay, as its southern terminus, and Cochrane, 250 miles north, the northerly terminus. North Bay is an important junction on the main line of the Canadian Pacific Railway, 227 miles north of Toronto. Cochrane is a thriving junction point on the Transcontinental Railway, approximately 600 miles west of the city of Quebec.

The system under consideration, including branch lines, aggregates 330 miles of single track.

With the threatening menace, the last few years of a coal famine in Canada, particularly with the bituminous variety used for present operation of this railway, the need for greater conservation and utilization of this country's resources is abundantly plain.

At the present time coal for the operation of this system has to be imported and hauled by steam locomotives 350 miles in Canadian territory to reach the southern terminus.

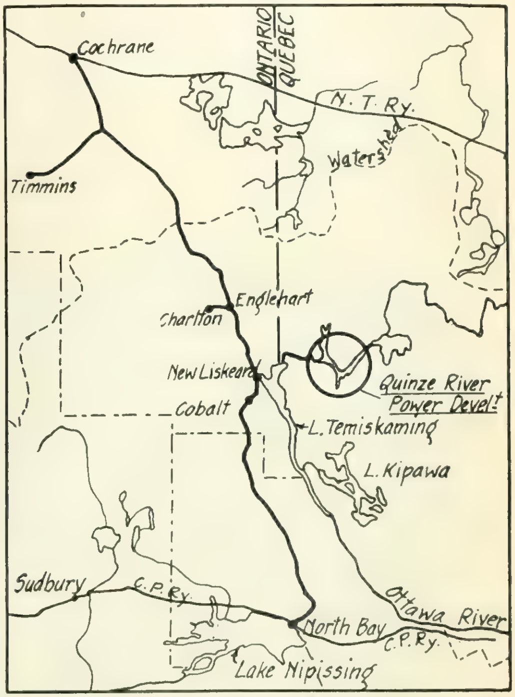
New Liskeard, Ontario, a thriving town of 3000 population, situated at the head of Lake Temiskaming, is approximately 110 miles from North Bay. Almost directly east of New Liskeard—about 9 miles distant—and within the province of Quebec, the River Quinze enters the north end of Lake Temiskaming. This stream, coming from the east, has an extensive watershed and flows through several large lakes at varying elevations, making possible the development of approximately 100,000 electrical horsepower within 30 miles of the main line of the Temiskaming and Northern Ontario Railway. Plans are now being considered for the harnessing of this vast potential, computed by hydraulic engineers as above mentioned. At Iroquois Falls, a point 100 miles or so north of New Liskeard, a large water-power development is already in operation for manufacture of paper products. This development might eventually prove a valuable auxiliary to the Quinze River power, ensuring constant supply of electrical energy for the railway. Good and valid reasons for the electrification of this system are much in evidence.

For comparison of costs of horsepower, it may be mentioned that for the New Liskeard-Cobalt district the present charges are over $50 per electrical horsepower, while at Toronto and on the Niagara peninsula the cost en bloc is less than $15 per electrical horsepower. With 100,000 horsepower of the Quinze waters now running to waste at a point within easy transmission distance of the line of railway, an immediate market is assured for probably 60,000 h.p. to meet the requirements of the railway and ever-growing demand of the rich mining regions, industrial plants and towns within the circuit. The proposition to develop and utilize this energy would seem to be quite an attractive one for capital.

In round figures, it is estimated that one electrical horsepower is equivalent in value to three horsepower developed in a locomotive by coal. The economic possibilities are obvious. If the initial capital expenditure is faced—even at present high cost of construction—there is reasonable assurance that all charges, with a good sinking fund, would reward the investors for this development.

There are features incidental to this railway quite its own. It is a complete and isolated system owned by the Province of Ontario, originally built to serve the lumber interests and pioneers of the district, without any forecast of the rich mineral regions it subsequently helped to develop.

When constructing the line economy was necessary; consequently the grades and curvature are not as favorable as present construction would aim for. Generally the maximum grades are only slightly over 1 per cent. and maximum curves 7 and 8. These features, however, do not appear as objectionable for electrical as with steam operation. With 2 per cent. grades on the Chicago, St. Paul Railway, trains of 5,000 tons are operated very economically.



Showing the T. and N. O. Railway line and its close proximity to ample power supply

Improvements in grades and alignment, as may now be contemplated for steam operation, might well be materially reduced, it being preferable and decidedly economical to spend the amounts on electrification of the system.

The T. and N. O. Ry. Should be Electrified

There is nothing on the T. and N. O. Ry. that can logically detract from electric operation. With all the necessary electrical energy conveniently near, there is absolutely nothing prohibitive in the electrification. For the field or line construction, wooden trolley poles with simple catenary construction, would meet all requirements, the former probably obtained locally at a reasonable price. Steel poles would be preferable for transmission lines. Economical construction throughout, serving not only the railway but also the rich mining districts of Cobalt, Larder Lake and Porcupine, the towns and villages within the circuit.

This line, with its own operating equipment, locomotives, coal-handling plants, extensive engine houses, adjacent repair shops and water stations, operating during winter months under severe conditions—with temperature hovering around 40 below zero, for long periods—the difficulties of steam operation under such conditions are not fully realized except by the operating forces engaged.

With the changed conditions brought about by electrification, there would be no coal for motive power to be hauled and handled, water stations located at practically every 18 miles could be cut out, maintenance and repairs of locomotives reduced to a minimum, housing space for locomotives cut in half, and hauling capacity of electric locomotives 100 per cent. greater than for steam.

The use of the electric locomotive brings out other features in operation and maintenance. The concentrated wheel loads are rather reduced than otherwise as compared to steam locomotives. The electric locomotive of to-day, wtih 40,000 lbs. on an axle, is infinitely more powerful than the present Mikado locomotive with 60,000 lbs. per axle. This means that many steel bridges which it may have been thought necessary to renew for steam operation, may with safety be left in service for some years to come.

Furthermore, it is the pounding of the unbalanced concentrated loads of the steam locomotive axle that breaks the rails and ties, that flattens the heads and spreads the rails, and causes depressions in the tracks—all a menace to safe operation. An electric locomotive is capable of hauling 4,000 ton trains at greater speed over heavy grades than would be practicable with steam locomotives. That limit of train is suggested as a conservative safe length of train to be operated under control of one crew.

The climate of the district is, of course, much more severe than on the Niagara peninsula, but much more favorable than has been described for the large mileage of the Chicago, Milwaukee and St. Paul. Yet we are told the extreme winter conditions there are no drawback to electric operation.

Much of the territory traversed by the Temiskaming and Northern Ontario Railway is forest and agricultural land with regions rich in minerals, greater development of which would certainly follow the advent of cheap electric power.

Great Saving of Money

The annual coal bill for this railway system and territory served, if capitalized, would more than suffice for the complete electrification and development of the power required. The time is ripe for the utilization of these inland water-powers. Conservation of energy in all its phases should be encouraged to the utmost. The development of the Quinze potential by private capital, with the railway system as a large and assured purchaser, is conceded the most satisfactory co-ordination of interests, and especially applicable in this case, where the success of one interest contributes and ensures mutual benefit.

There is no projected electrification of steam railway in Canada to-day that offers more advantages with quicker development of power, moderate length of transmission lines and greater saving for a single track mileage.

The electrification of steam trunk lines is now beyond the experimental stage.

Direct current of high voltage, with automatically controlled sub-stations 25 to 30 miles apart, transmission lines not over 150 miles in length, electric power should be available at a profit for less than $25 per horsepower, meaning undoubtedly a large saving in operation, not possible with coal.

One more attractive feature regarding the capital expenditure as a whole, is that its distribution for the purchase of materials and every class of electrical equipment from our own industrial resources, must in turn benefit labor, enhance property values and otherwise enrich the province and its people.

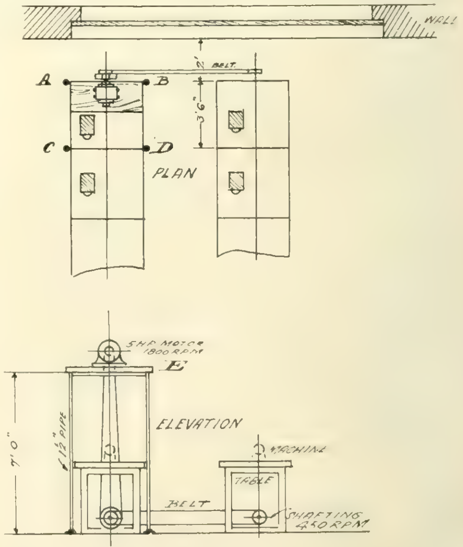
Surely there is sufficient of interest to every member of the Provincial House, which it may be hoped will in the near future warrant action being taken by the Government of the Province for the carrying out of this work.

The aim and object is for efficiency in the utilization of capital, energy and labor for the advantage of Canada.

Installation of Small Induction Motors for Power Tables

By J. A. Burnett, A.M.E.I.C.*

The use of power tables in the blouse and shirt industry is increasing largely and the method of drive is important. These power tables usually consist of a table, with 12 or 24 sewing mahines thereon, depending on whether the tables are single or double. Usually one 5 h.p. motor is installed to drive 24 machines and the location of this motor deserves some study.



Plan and elevation of power table

The spacing of these sewing machines is about 42 in. and in order not to interfere with the operators movements, no posts may be installed except at these centres. The drawing herewith shows a satisfactory method of installing a small motor The posts ABCD are made of 1½ in. WI pipe and the platform at E is composed of 1½ in. hard wood on 1½ in. by 1½ in. angle. The drive is vertical, and though this is not looked upon with favor, has been found quite satisfactory for small power drives. The cost of the stands is about $50 each, installed Several have been installed by the writer at the new factory of the D'Allaird Manufacturing Co, Ltd. Laurier Ave., Montreal.

*Of Stewart & Burnett, Consulting Engineers, Montreal

Two Unique Hydro Electric Plants in Quebec

Among the most important of the smaller hydro-electric developments in the Province of Quebec is that of the Lachute Shuttle Company, Limited, Lachute. The dam is situated on the North River. There is an open forebay 180 feet long by 35 feet wide. It is bounded by two heavy concrete walls. Guard racks are placed at the entrance to the wheel pits with head gates inside the power house to cut off each turbine separately.

The power house is of concrete construction, 31 feet by 72 feet, with tile roof. In the interior there are three 70 inch Canadian turbines operating under 14 ft. head. These are direct connected, through gears, to a 500 kv.a., 200 r.p.m., 60 cycle, 2,200 v., Canadian General Electric generator. An exciter is driven from the main shaft by a Morse silent chain. A Woodward Model F. governor is belted to the main shaft. The water wheels can be operated singly or collectively. At present only two are being operated, the third wheel only to be used in case of fire. A thousand gallon Rodney Hunt fire pump is connected to the line shaft by means of a Morse silent chain.

The switchboard is made up of six panels, and was manufactured and installed by the Northern Electric Company, Limited. It consists of six oil switches, and six circuit breakers together with the ammeters and voltmeters. Three 100 kw. Moloney step-down transformers, 2,200 v. 550 v. are situated at one end of the switchboard.

Besides supplying the power for their own plant, the Lachute Shuttle Company, Limited, supply power for lighting Lachute and Brownsburg.

The company is, at present, installing an auxiliary power plant at their old power station. This power unit will consist of a 70 inch Canadian turbine, operating under a 24 ft. head developing 600 horsepower, and belted to a 400 kw., 2,200 v., 60 cycle Canadian General Electric generator. This will be run in parallel with the present plant.

The dam at No. 1 plant was started last fall, but, owing to high water, this was not completed. It is the intention of the company to complete the dam this summer. No. 1 plant will then have a working head of 17 ft. The dam will be 340 feet long and of the pier and stop log type.

An interior view of the power house is shown.

Another Plant at Brownsburg

Another hydro-electric development of importance in the Province of Quebec is that of the Dominion Cartridge Company, Limited, Brownsburg, Quebec. The dam is situated on the West Branch, a tributary of the West River, about 800 feet from the power house. The water is conveyed through a thirty inch stave line to the power house.

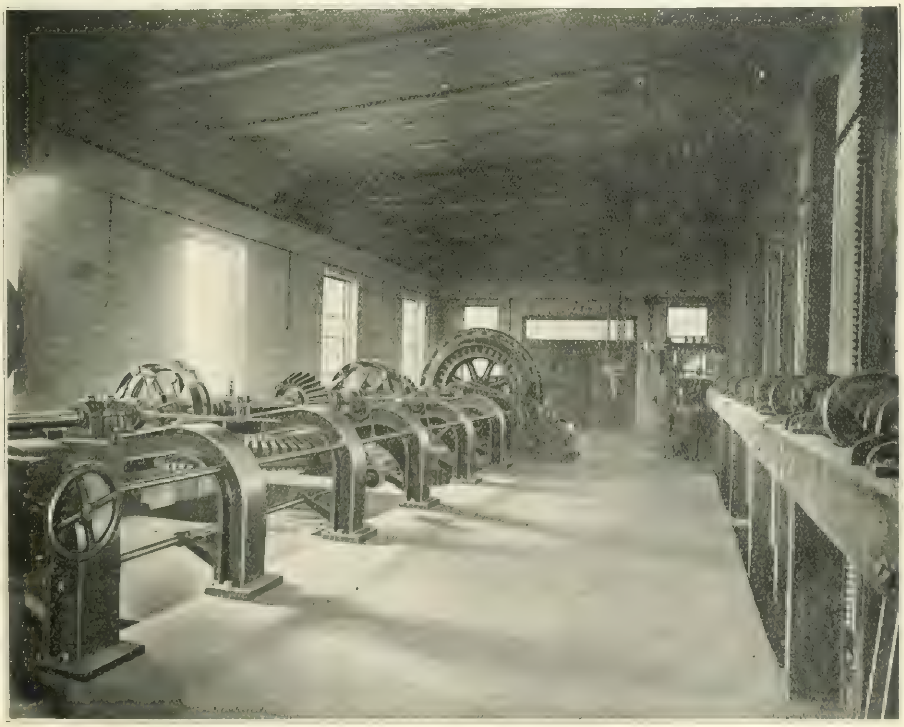


Fig. 1—View of generating plant of the Lachute Shuttle Company

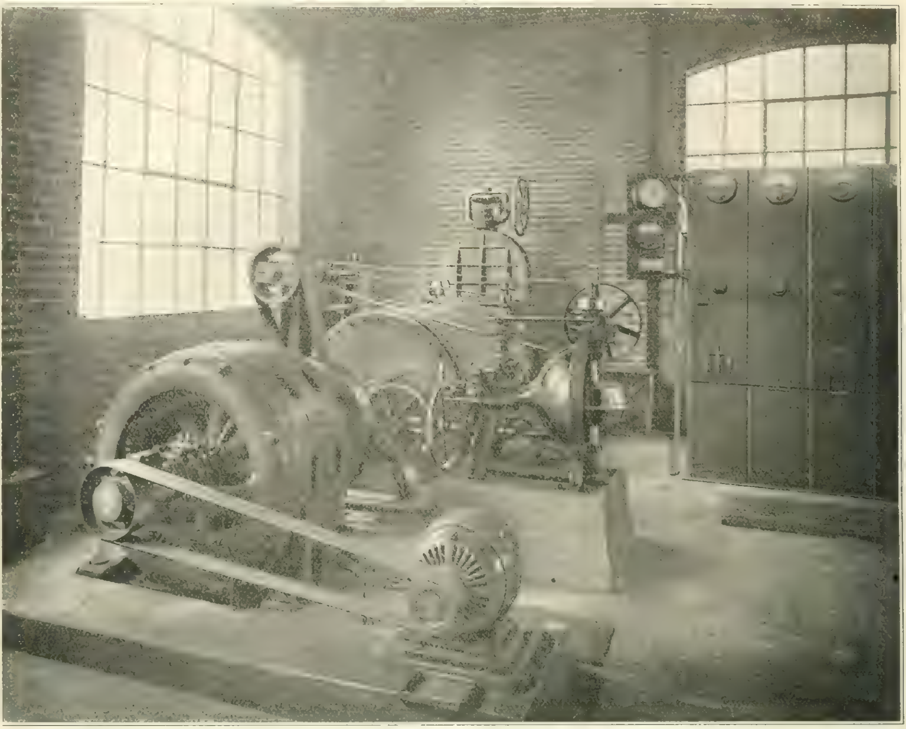


Fig. 2—View of hydro-electric generating plant of the Dominion Cartridge Company

The turbine unit has a 70 ft. head, and a 15 ft. draft tube. Two 14 inch Canadian turbines are direct connected to a 75 kw., 600 v., 900 r.p.m. Canadian General Electric generator. An exciter is run off the main shaft by belt, together with a Woodward compensating governor.

The switchboard is made up of air panels, manufactured by the Canadian General Electric Company, Limited. There are four oil switches, and two auxiliary switches. The auxiliary switches are only used in case of a breakdown at the power house.

The construction of the Safety Fuse plant, which is now under way, will necessitate the addition of another panel to the switchboard.

An interesting feature of this plant is that the main power units are two steam turbines of 250 horse power each, direct connected to electric generators. The hydro-electric unit and the two steam turbo-electric units are all situated on the same floor in a very small floor space and operate in parallel, the hydro-electric unit operating for 24 hours, handling the full load at all times when it comes within its capacity. A view of the hydro-electric unit is shown.

The "Canadian" turbines for both these plants were supplied and installed by Chas. Barber & Sons, of Meaford, Ont.

Personals

Mr. R. A. Brown, who has been superintendent of the Calgary Electric Light Department for many years has been appointed superintendent of the Municipal [illegible] at Calgary. Mr. Thos. H. Macaulay, who held this position as announced in our issue of Feb. 15, has gone to the New Brunswick Power Company, St. John, N. B.

Mr. J. A. House has been appointed manager of the Guelph Radial Railway until it is taken over by the Hydro-electric power Commission on July 1.

Mr. Edward F. Sise, who in December last resigned the presidency of the Northern Electric Company, has joined the firm of H. C. Scott and Company, stockbrokers, Montreal.

Mr. A. L. Winston, of the Victoria Electric Company, Limited, Toronto, is spending a few weeks in California. On his return he intends making a business trip through Western Canada.

Mr. W. S. Rugg, manager of the Railway and Marine Departments, and **Mr. Charles Robbins,** assistant sales manager, have been made assistants to the vice-president of the Westinghouse Electric and Manufacturing Company.

Mr. C. W. Stokes. of the Siemens Company of Canada, Limited Montreal, has left for England, to consult with his principals, the directors of Siemens Brothers & Company, Limited, and the English Electric Company, Limited.

Mr. James Wilson, recently elected to the Board of the Shawinigan Water and Power Company, Limited, first entered the service of the company as chief accountant in 1911 and was appointed secretary in 1914. Previously he was with Drummond, McCall and Company for several years. He is a director of the North Shore Power Company, Three Rivers Traction Company and Laval Electric Company.

The Contractor-Dealer

The Value of Proper Illumination—In Stores, Factories, Homes—Insidious Effects Due to Bad Lighting

The value of proper illumination in city streets, stores, factories, etc., can be established more or less definitely by experiment. Unfortunately, it is not so easy to determine the value of proper lighting in the home. We know that sufficient and correct light in the kitchen tends to promote cleanliness and proper preparation of food, which affects health. We know that light incorrectly used in the sewing room, library and living room impairs vision, and if the conditions are aggravated, permanently injures eyesight. We know that serious injuries have been caused by falls due to glaring and insufficient light in stairways, halls and basements. But there are effects due to improper lighting which are even more insidious, because they are less evident. Improper lighting affects the disposition, good temper, cheerfulness of the inmates of the home. Because these effects arer psychological in nature, they are more difficult to determine and describe. The initiated know, but the average perrson may live with terrible lightng-condtons and be conscous of something being wrong without knowing what it is. Many of us have had a social evening at a friend's house spoiled by glaring light sources. To sit for hours before a hideous glaring living room ceiling fixture is enough to try the good temper of a saint, let alone an ordinary human being. It is this aspect of the value of proper illumination that is perhaps the least considered, if not the most important. It is second only to that of the conservation of vision. Proper illumination is necessarry to a happy home, and fortunately it is a procurable commodity.

Good illumination properly applied is no more costly than poor lighting. It is within the reach of the vast majority, but like all good things, money alone will not suffice. Care and study are necessary. Co-operation between architects, decorators and lighting specialists is imperative to insure that proper lighting furnishings shall be available and properly applied.

Not all of the responsibility rests on their shoulders. In the past, apparently there has been an all too evident disposition on the part of the user to neglect the lighting of his home. It has been one of the last things considered and, seemingly, the least important, yet it affects directly health, cheerfulness and good temper. Irritability, excited by improper lighting has no doubt been in many cases the indirect cause of family differences. If the user is to enjoy the fruits of a happy home, he must give to the lighting problem the same careful consideration as he does to its other important details. Glaring light sources, whether in the ceiling fixtures, side brackets, floor or table lamps, should be avoided.

Proper lighting has the same value in the school, as it has in the home. Obviously, further comment is unnecessary.

Show Window Lighting

No one questions to-day the selling power of the display window. The relative rental costs of show window frontage to store floor space is ample proof that the show window is by far the most valuable part of the store. While merchants have realized this for some time, it has only been in recent years that they have recognized the full value of their windows as a sales asset.

Show windows, however attractively dressed and arranged, sell merchandise only when the merchandise can be seen. Artificial light is needed during the dark hours to complete a window and that artificial light must be properly applied if it is to be effective. Illuminants incorrectly placed and arranged may be almost as ineffective as no lights at all.

A display window is much the same as a stage in a theatre. The goods on display may be likened to the actors and the window shoppers to the audience. The good stage manager contrives to keep all glaring light sources out of the eyes of the audience and at the same time light the actors in such a way that their every move and expression may be clearly seen by the audience. He contrives to arrange his stage lights so as to have the shadows in the proper direction and to have the proper amount and quantity of light to produce exactly the effect he desires on the audience.

And so it is with the window dresser. His object is to sell goods and not to display lighting fixtures or glaring light sources. He desires to arrange his window so as to set his merchandise off to good advantage and in their true light as to quality and design.

The proper lighting of the show window takes into account the location of that window, whether it is a small town, in the outlying section of a large city, or in the downtown business section of the large city. Clearly, a large volume of light is required in the downtown business section of the city, for the reason that a window so located is in competition with those of other merchants, and chiefly, because the streets are illuminated to a higher intensity. Consequently more light is required in the window to attract the attention of the pedestrian. A well lighted window attracts the passerby, much the same as a bright light attracts the moth. Window shopping is most effective when the busy business man is relieved of his day's cares and his mind is most receptive to his personal needs.

More and more artificial light s used for display lighting in the day time, as it has been found that proper light from within the window during the day nullifies somewhat the bad effect of reflections from the plate glass. Very often these daytime rerflections are so prominent as to reduce the effectiveness of the window.

Store Lighting

The fact that nearly all stores, especially those handling dress goods, suits or clothing, use artificial light throughout a great part of the day, makes it extremely important that such stores have efficient lighting arranged so as to give the correct distribution and right quality and quantity of light.

It is impossible to estimate the value of a well lighted store, from the standpoint of the effect it has upon the consumer, because it has a psychological effect which influences one person differently from another. The impression received by a customer of a well lighted store is cheerfulness and ease in which to see the goods, thus giving the merchant the benefit of his well arranged counters, shelves, show goods, etc. No matter how well the goods may be arranged, unless there is illumination without glare, the storekeeper will lose a great part of the good effect of his displays.

Frederick J. Pearson, electrical and mechanical engineer of Marshall-Field Company, of Chicago, in a paper before the Illuminating Engineerng Socety, said: "Good lighting increases production just at it increases sales in a store. Increases of illumination intensity from 6 to 10 foot-candles have increased the cost of lighting by only 1 per cent. and have been found to promote sales by 6 or 7 per cent."

In these days of high wages, time is of great importance to the merchant, and yet many merchants will fail to give any consideration to the illumination of their stock rooms, thereby wasting a great deal of the time of the clerks endeavoring to locate surplus stock. This should be given more consideration as a loss of a few minutes by each clerk amounts to considerable at the end of the year.

Trrors in marking and checking of goods in shipping departments are frequent. While all errors cannot be prevented, the readiness to see and read sales tickets and packing case labels is extremely important. A fairly high intensity of illumnation in these departments is important, as it contributes to the elimination of costly errors.

To summarize, the importance to the merchant of proper illumination brings out two important requirements—the ability of the customer to see clearly the goods on display thereby creating the desire to buy under these conditions, and the ability to locate articles and goods on shelves quickly, thereby increasing the efficiency of the salesmen as well as creatng a record for good service.

Industrial Lighting

However valuable proper lighting is in the home, store and city streets, our immediate need for more and better light is in the industrial field. Extensive investigations of industries in Chicago, conducted by competent lighting experts of the Commonwealth Edison Company, in conjunction with plant managers, has awakened the lighting industry. These results indicate that a 15 per cent. average increase in production is possible at an added cost for lighting of but 1 to 6 per cent. of merely the labor cost. Individual factory outputs were carefully recorded during a month's run under indifferent lighting and compared to the production during a corresponding period under practically identical conditions, except for a change from indifferent to proper illumination. The results of some of these tests are briefly summarized herewith:

Class of Business	Old Lighting Watts Sq Ft	Old Lighting Foot Cdls Intensity	New Lighting Watts Sq Ft	New Lighting Foot Cdls Intensity	Average Increase Produc.	Increase Cost Add. Ltg
Iron Pulley Finishing Shop	27	2	1.90	4.8	20	5.5
Heavy Steel Machine Shop	60	3.0	1.70	11.7	10	1.2
Carburetor Assembly Shop	[illegible]	2.1	1.90	12.5	12	9

It will be seen that better lighting increases production and that at a comparatively insignificant cost. This is 15 per cent. increase is equivalent to the production of an army of approximately 1,500,000 workers, who consume neither food, clothing nor materials in any form an army that produces without additional factories or machinery; an army that gives at least two-thirds of its wages to be divided between capital and labor.

Proper factory lighting, in addition to increasing production, has the further advantage of reducing spoilage and factory seconds. Spoilage is a direct loss in material and labor, and factory seconds are a partial loss, since they are usually sold at a reduced price. Proper illumination reduces spoilage and factory seconds, because it enables the workmen to measure accurately and perform their functions without guessing.

A well lighted factory or office is a pleasant place to work in. The employees like it because it enables them to do their work with comfort and without eye strain, and because it shows a disposition on the part of the employer to provide them with proper working conditions. The majority of satisfied employees favorably disposed towards the management usually remain permanent employees. This results in a lower labor turn-over, and consequently saving in employment and training cost. One company estimates that the training cost of one new employee in spoilage, factory seconds and the loss of production on the machines and floor space occupied by the employee varies between $200 and $1,000, depending upon the operator and the nature of the process. If the labor turn-over of a plant, employing 500 people, is 20 per cent., this results in a production burden of from $20,000 to $100,000 yearly.

One of the great mistakes made by large industries and department stores is their lack of consideration for their office force. This is not intentional, but little study has been made of the value to the employer of proper lighting in the office. The elimination of all glare from portable fixtures, etc., in a large office will materially affect the efficiency of the office force. Extreme care should be taken in arranging for proper illumination in the office, regardless of its size.

Proper lighting has a value in preventing accidents and in conserving vision impossible to estimate. For certain purposes, we place a value on human life, but no one can estimate the misery and sorrow occasioned by the loss of a loved one. Investigations by insurance companies, large corporations and government agencies, have found improper lighting is the cause of a surprisingly large percentage of industrial accidents. Authorities vary in their estimates between 18 and 25 per cent. From 18 to 25 per cent. of our one and a half million yearly accidents is a tremendous loss to charge up to wrong lighting. It is appalling to think that each year our industries will and maim a number of men equal to the U. S. casualties during the great war.

The Electric Club of Toronto

A very interesting address on the subject of "Electric Welding" was given before The Electric Club of Toronto at their meeting of March 5, by Mr. Unland, of the General Electric Company, Schenectady. Mr. Unland particularly dealt with the economic value of the electric weld, pointing out, by many illustrations, the wonderful repairs that are now made to steam locomotives and other machinery and equipment that formerly was useless and frequently discarded when broken. The lantern slide illustrations added very materially to the interest of the lecture.

James Wilson, secretary of the Shawinigan Water and Power Company, Limited, has been appointed a director of the company.

The Pessimist: "It can't be done."
The Optimist: "It can be done."
The Peptimist: "I have done it."

The Electric Pad in the Sick Room—Have You Ever Told the Medical Men in Your District About It?

It is doubtful if the value of the electric heating pad has been brought before the attention of the medical profession with sufficient insistence. A number of suggestions are given below which may help the contractor-dealer to start a more intensive campaign. If medical men, generally, could be brought to see their value and would give them a kindly word of recommendation as they go about their daily round of calls, they would be doing their patients and the electrical industry both a good turn at the same time.

Pure air with plenty of oxygen is vital in combating disease; but this is often difficult without putting too severe a strain on an already reduced vitality. A multitude of blankets helps to insulate and retain body heat—but with a weakened condition, their weight is oppressive. The ideal is obtained by having light covering on the patient and a source of mild but constant heat uniform and unvarying, such as can be supplied by an electric heating pad, equipped with thermostatic control. Such an arrangement allows the skin as well as the lungs to breathe. This same electric pad with a rubber sheathing is thoroughly adapted also to keep hot poultices at a uniform temperature.

The hot water bottle and rubber bag are archaic—They start with an excessive heat and are soon clammy cold—They require frequent refilling with the necessity of disturbing the patient and leaving him without the warmth during the refilling process.

It necessitates also, frequent attention, which is often difficult in crowded hospitals and almost impossible in the home, dependent upon amateur nursing.

Healthy persons can stimulate blood flow—that is—increase the circulation by vigorous exercise; but with the bed-ridden patient, this must be brought about by artificial means.

The treatment of various ailments requires a different degree of heat, and often local application without undue weight on the part affected.

A two quart rubber bag weighs over four pounds—a ten inch pad, only six to ten ounces. The bag soon gets cold—the electric pad maintains a constant heat of predetermined degree—which temperature is adjusted by the simple turn of a dial hand.

The range of temperature of these pads is generally from 100°F. to 180 or 200°. No temperatures higher than 130°F. are advisable for direct application—the higher ones being for wet applications on special cases.

Make the following suggestions to the medical men in your neighborhood and hear what they say about it. To a layman they read like common sense:

Apoplexy—Place pad to the soles of feet; this draws the blood from the brain and helps restore the abnormal temperature to normal.

Abscess—The pad helps to soften the abscess and so relieves pain.

Backache—Pain is usually quickly relieved by placing the pad on small of back.

Bladder—(Inflamation of)—Place pad over bladder, Relief from pain and frequency of urination is obtained.

Boils—Helps formation of pus and hastens cure

Colic—Placed on abdomen the pad relaxes the muscles and relieves pain.

Chills—Pad brings the blood back to the surface of the body when placed at the feet and on the back.

Concussion of Brain—Use pad at feet; blood is thus drawn from brain which helps restore normal temperature.

Cramps—By relaxing the muscles the pad relieves the pain when placed on abdomen.

Convulsions—Place pad to soles of feet to maintain temperature.

Carbuncle—Pad helps the formation of pus, relieving pain and hastening cure.

Earache—Relief is frequently obtained by using the pad.

Gangrene—Maintenance of circulation is aided by placing the pad on affected parts.

Grippe (LaGrippe or Influenza)—The pad relieves pain and soreness of muscles.

Gall Stone Colic—The pad relieves pain, when placed over seat of pain.

Headache—By drawing excessive blood away from the head the pad usually cures headache when placed at back of neck and to the feet.

Insomnia—As this is usually the result of to much blood in the brain the pad placed at feet is sufficient to induce restful sleep.

Inflammation—In these cases there is an over supply of blood in affected part. This is distributed throughout the body, and pain greatly relieved by placing the pad over inflammed area.

Indigestion—The pad is of great value in relieving pain when placed over upper abdomen.

Kidney Diseases—Pad will often relieve pain if placed over affected kidney.

Lumbago—To relieve pain, the pad should be placed on small of back.

Laryngitis—The pad applied to neck over the larnyx, relieves pain and helps restore voice.

Malaria—The pad applied to feet is of great advantage in the cold stage of this disease as well as in remittant and intermittant fevers.

Neuralgia—The pad by soothing the affected nerve, relieves pain when placed over painful area.

Nervousness—The pad is very efficient in allaying nervousness when applied to the feet and on back of neck.

Neuritis—The pad by soothing the affected nerve, relieves pain when placed over painful area.

Paralysis—Affected part is generally cold. The pad restores the part to normal temperature.

Peritonitis—The pad applied to abdomen usually relieves pain.

Pneumonia—When placed on chest, the pad gives considerable relief from pain.

Pleurisy—When the pad is applied to the part of chest affected, it relieves pain to a great extent.

Piles—The application of heat by means of the pad usually affords relief from pain.

Rheumatism (Articular and Muscular)—Pain is relieved by the application of the pad to the affected part.

Sprains—Applied to the injured part, the pad reduces the swelling and relieves pain.

Shock—When placed at the soles of feet, the pad often restores the circulation and heat to the surface of body.

Sciatica—When placed at the back of the thigh the pad is a very efficient means of relieving the pain.

Smallpox—The accompanying backache can be relieved by placing the pad on back.

Stiff Neck—The pad placed on the side of neck will very frequently relieve pain and relax contracted muscles.

Stye—The pad placed over the eye will act very favorably in relieving the pain.

Toothache—Great relief follows the application of the pad to the side of the face.

Ulcers—Heat applied by means of the pad is a great factor in the cure of this stubborn condition.

A word of caution while electric pads are insulated and thoroughly shock proof, it is wise to use a rubber cover (under the cloth clip) when they are used for young children or where there is a wet application. This will avoid the possibility of burn.

Finally, as to the amount of current used, this is really a negligible item. Electric pads take only about 50 watts at high heat. The thermostat opens the circuit when the desired degree of heat is obtained and closes it again automatically, when the temperature is lowered, i.e., the current is used only a fraction of the time.

Over a million electric irons are sold annually to the North American housewife because they are a convenience and save labor. Electric heating pads should be bought because they are a necessity and save life itself. Millions of rubber hot water bags are in the homes and should be replaced by the more efficient and safer electric pad.

Suggestions for the Contractor-Dealer — Are You Ready for Your Easter Display?

One proprietor of an electrical retail store spends two hundred dollars a month advertising his business—and then makes a practice of haggling with every customer who may have some grievance over a two-dollar article which he or she claims did not give satisfaction. Even if the customer is wrong, it doesn't pay to haggle—or to tell him so. Be diplomatic—follow the merchandising ideas of the better department and specialty stores.

Keep records of errors. An electrical salesman that we know of keeps what he calls an "error book." In this note-book he jots down just why he lost a sale. In spare moments he goes over these notes and rectifies the possibility of future loss of sales by similar mischance. This idea, while not adaptable to every clerk or salesperson, is a valuable aid to prevent lost sales. Here are some specimen entries: "Customer had to wait too long for change to learn whether store would sell on her terms"; "Did not have price cleaner she wanted on floor or in stock; forgot to show her photographs in manufacturer's sales helps"; "Customer could buy same article for less elsewhere"; Customer said could not get washer in her apartment because of small doorway—forgot to show her literature of other types that we could get for her"; "Wanted longer cord"; "Had no place to connect device—should have sold her outlets," etc.

Push feature goods. Watch the calendar of electrical selling; observe the manufacturers' advertising; push advertised goods—in that way you'll find that stock just automatically finds its way off the shelves, onto the display tables, into your newspaper, and finally into your customers' homes.

Another dealer says: "We derived a little profit and considerable advertising from the 'Electrolier-giving-away' stunt. About 600 lamps were sold for cash during the contest. The window display consisted of a pyramid constructed of lamp cartons ranging in size from 100-watt on the bottom to 7½-watt on top. A card asked the question, 'How Many Lamps in the Cartons? First correct guess secures the 'Electrolier.'

"The 'Electrolier' or portable lamp stood on top of the pyramid. Small cards numbered from one up were prepared with each Mazda lamp purchased one card was furnished as a guessing coupon. Guesses were deposited in an iron service box, through the conduit hole. A few days after the contest closed a boy went into a window with an adding machine, added, checked and rechecked the lamps in the pyramid, box by box. After getting the exact number of lamps he began searching for correct guesses. The process was arranged so as to take two or three hours, and thereby attracted considerable attention."

Get the money in. Check up your outstanding accounts. Remember that during periods of prosperity people are inclined to be liberal and "easy" with their money, particularly if they can have goods on "easy payments" and "long-time terms." But don't antagonize your customers by frequent duns. Oft-times your bookkeeper through carelessness and other demands upon her time will not keep her accounts posted up-to-date, and so is late getting out her monthly statements. If your statements do not go out in the mails until the 5th to the 10th, you'll find the returns very slow. Remember that many people pay bills in the order in which they are received. Get your bills into the mails either on the last day of the month or the very first of the new month. It will speed collections.

Talking with a contractor in January, he made this statement: "I have increased my salary to myself to $100 per week, commencing the first of the year. Mine is practically a one-man business, and I've been surprised to find that I have been under-paying myself for over a year. In other words, while costs and prices have gone up, I've kept right on paying myself the old salary—forgetting to take an increase and charge it against my business."

Study the effect your window display will have on your customer. Recently, the writer saw a window containing a number of very attractive looking electric appliances, but it was decorated with artificial flowers. There are many people who have a deep rooted objection to anything "artifical"—it lacks the stamp of "genuine." To such a person, the impression received would be that the electrical appliances themselves lacked quality. Study the habits and the likes and dislikes of your customers. It is your business to serve, rather than educate, them.

Keep your mind on the seasons well ahead of time. Easter is coming. Don't forget the many little touches that you can give your window at this time of the year. Put egg-boilers in a prominent place in your window display. It will help to impress the fact that there is an electrical device for every season and every occasion. In the meantime, make use of the electric incubator and when the eggs are hatched out, the brooder, with its family of down chicks is a most attractive display. If the eggs can be hatched out about Good Friday, so much the better.

Be sure that the side wall outlets and convenience outlets are so located that the persons who are going to live in the house will be pleased. Builders and architects have been criticised by a great many housewives for placing the kitchen sink too low. Whether or not it is always the fault of the builders is beside the question. The fact is, he gets the blame. Same with outlets. Often the contractor gets the blame when it is not his fault that the light in the bath is in such a position that a shadow is cast on the curtain, or the light in the kitchen forces the housekeeper to always stand in her own shadow when working at the range or sink.—S. E. D., Monthly Sales Service.

The Awakening of Dealer Lumsden

Brown Gets a Surprise—His Friend Proves an Apt Pupil—How Can I Finance It?

Lumsden Gives Brown a Surprise.

Brown came down to breakfast one morning, picked up the paper and glanced idly over the pages. Suddenly his eye was attracted to an advertisement the heading of which read:

Wanted, Some One to Prove Me a Liar.

Underneath was a description of the "Can't Beat It" washer and the fact that the sole agent was A. L. Lumsden of 126 Fairview Avenue. The final explanation was that if the appliance would not do all that was claimed of it no charge would be made for the washer.

Brown rushed to the phone and called up Lumsden. Lumsden answered the phone:

"Hello, that you Lumsden, this is Brown."

"Oh I'm fine. How are you?"

"That's good. Say what's the big idea. I have been reading your advertisement in this morning's paper. It almost sounds as though you had got an idea of your own."

"What's that—you have—good Heavens! I must come over and look into this. I'll be over in half an hour."

Brown hurriedly finished his breakfast, and rushed off, all excitement, to Lumsden's. When he got there he found his friend busy arranging with a printer's salesman for a supply of large posters. Then the dealer came across to Brown and slapping him on the sholder, said:

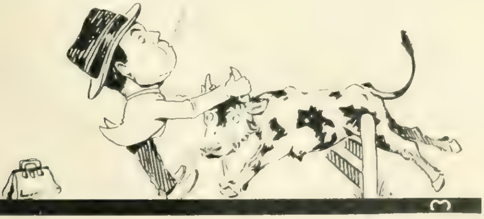
"Well old man, what's the trouble?"

"Why the fact is I can't quite believe that you have got an idea of your own."

"Tease away, I don't mind. I am so tickled over the idea, that your joke is a compliment."

"Seriously though, tell me all about it."

"Well the fact is I was thinking the other day of the famous saying ascribed to Mahomet 'If the mountain will not come to Mahomet then Mahomet must go to the mountain.' I was not entirely satisfied with the sales of washers and the quotation gave me an idea. I am satisfied that I have got the best washer on the market, but if the people do not know it, it might as well be the worst. Since the last big advertising campaign my sales have increased wonderfully, but I figured that they ought to increase still more. I did all I could to persuade people to come and see the washer demonstrated, and not without success. I have a machine that will be a benefit to any home in which it is placed and every home should have one. How to reach every one was the question which floored me at first. Then came to my mind the saying of Mahomet and in your absence I took the bull by the horns myself. I [illegible] First of all I had two hundred double post cards printed. On one side was the explanation of my scheme; this card I addressed to a selected list residing in the neighborhood. The other card was addressed to me on [illegible] the other was



Lumsden took the bull by the horns himself

Name...................................

Address...................................

Washing day......................

Tel. No.

If you want further information on the matter mail this card to me A. L. Lumsden.

The result was very good. I received back on the average, one in ten which you will admit was worth while I called up three of these people, whose washing days were Monday, Tuesday, and Wednesday respectively, and arranged to deliver to their homes, a washer for one day's trial. At the same time I strongly advertised in the papers.

Called up to make an appointment for an after-supper chat

"But what did you expect from such a move?"

"Well, I will give you the result of one such experience. Mrs. Langton had often been in the store for little things, but I had never thought to interest her in anything like a washer. I was very much surprised then, to receive, by rerturn post, the card giving me her washing day, and adding that she would like to talk the matter over with me. She asked me to call when her husband was at home. I rang them up before I started to make sure I should find them in, and found them very interested in my scheme. I explained to them, that, in order that my customers in the neighborhood should have an opportunity to test the value of the Can't-Beat-it washer I was willing to loan them one for one washing day, and deliver it. They appreciated this but seemed a little suspicious that in some way I would be binding them to buy. I explained to them that I had no such intention. If by making such demonstrations, I should in time cause the machine to deteriorate in value, I was optimistic enough to believe that such demonstrations would sell me enough washers to make the deterioration of one machine a mere bagatelle. Well, to make a long story short, I delivered a machine to their home and explained to Mrs. Langton the way to work it, and then left her with the promise to call the next day for the washer. True to my promise I sent for the machine, but the driver came back without it. He gave me a note from Mrs. Langton in which she asked me to call round at her husband's office. I went as she requested, and Mr. Langton received me very kindly. He asked me several more questions about the washer all of which I answered to his satisfaction. Finally he asked me the price. I told him and he immediately wrote out a cheque for the amount saying that his wife was so pleased with the machine that she was desirous of keeping it. Moreover he asked me to send him information concerning other labor saving devices. I was delighted with the success of my scheme, and when I tell you that since then he has spent two hundred dollars on other appliances, you can guess that I am in danger of getting a swelled head.

"But you have not had success like that all the time."

"By no means. But the very poorest week since I began has been the sale of one machine, and that has only happened twice."

"How long have you been working this scheme?"

"Oh, about six weeks. The particular advertisement you saw is the result of some critical remarks made by some canvassers of another kind of washer.

"Well its a corking good idea and if it does not bring you in more business, I'll eat my hat. But tell me how you can find time to run about so much, and look after the store at the same time"

"Why, to tell you the truth, I simply had to get an assistant. At present he is out on business for me."

"Better and better. What is your next move?"

"I have no other move until this idea is worked out."

"I think you are right. So many dealers try to handle too many ideas at once, and the result is always the same, they make a success of none. I have just one question to ask you. What system of payment have you adopted?"

"Strictly cash."

"Why."

"Oh I don't know, simply because I had never given any other system a thought."

"How many sales have you lost in the six weeks as the result of people saying 'I can't afford to buy one at present?"

"A dozen at least."

"There you are, and if you had made arrangement with them for payment by installment you would probably have made at least ten sales out of the dozen."

By Jove I never thought of that. Say, Brown, I sure do need you to follow me round picking up the ideas I pass by. What system yould you use for such payments."

Twenty-five per cent. down and six monthly payments for all articles over one hundred dollars. For less than a hundred fewer monthly payments."

"That sounds alright. I will sure get busy on that at once. I wonder how I could finance it."

"I will leave you to think that over," said Brown, as he left the store, then to himself: "Boy, oh Boy, your pupil is coming along O.K. We'll now turn to the fourth lesson."

Talk Lighting to the Returned Man

There are thousands of men who never knew what they were missing in the way of good lighting in the home until they had lived for months in army huts, ruined houses, and filthy dugouts, with nothing but candles to light them. Now they are home again, and for the most part settled down, the electrical dealer should be after them to have the very best of fixtures in their homes.

The third anniversary of the taking of Vimy Ridge will soon be here. Make it a time to remind the men what they lacked in those days, in the way of light. Emphasize the beauty of light; its health-giving qualities; how a good light will preserve the eyes, and the temper. Show how, with the old flame lights it was not possible to get the many shade effects possible with electric lights. Point out that there is no offensive smell, nor are matches needed to light up; and make clear the hundred and one other little advantages which make electricity so much ahead of any other means of lighting.

Hoover Dealers in Toronto "Get-Together" at First Annual Dinner Party

The first of a series of "get together" meetings of Toronto, Ont., Hoover dealers, their representatives, and Hoover resale men, was held at the Carls-Rite Hotel in Toronto on Tuesday evening, March 2nd. During the dinner, those present were entertained by Mr. Jules Brazil, the well-known Toronto entertainer. District Manager J. Skelton of Toronto acted as chairman, and in his opening remarks gave a very interesting talk, briefly outlining the fact that Hoovers were now made entirely in Canada at the company's new plant at Hamilton, Ontario; the sales policy of the company, the co-operation the company gives its dealers, etc., and then introduced Mr. Thomas F. Kelly, the sales manager of the company.

Mr. Kelly enlarged on Mr. Skelton's remarks regarding the Hoover campaign which is being conducted during the month of March in Toronto. Various quotas had been set for the dealers, and Mr. Kelly outlined concrete requests for co-operation on the part of the Hoover dealers in the way of window displays to be conducted by all the dealers at certain periods during the month; special and consistent newspaper advertising during the campaign period; distribution of advertising literature furnished by the company; outdoor advertising through the medium of dealers' automobiles, trucks, etc.; special interior store advertising; the use of sales charts in the various dealers' Hoover departments, and daily meetings to keep up enthusiasm, and then a very broad scheme to be followed by the head of the Hoover department in the various dealers' establishments to secure the co-operation of each employee, salesman and saleslady in order to secure the sales quotas that had been allotted to each dealer. Mr. Kelly also laid great stress on proper emphasis being given during the campaign to the fact that Hoover suction sweepers were an entirely "Made in Canada" product.

Following Mr. Kelly's sales talk, Mr. Skelton called upon the head of the Hoover departments of the various dealers, and Mr. E. C. Budd of The Robert Simpson Company, Limited, Mr. A. J. W. Stewart of the Toronto Hydro Electric System, Mr. H. R. McNeilly of Murray-Kay Company, Limited, and Mr. W. S. Bushall of the Toronto & Niagara Power Company responded in turn.

Mr. Budd complimented the Hoover Company on their sales policy and modern factory at Hamilton, and assured Mr. Kelly that the plan that he had outlined would be followed practically in its entirety at their store.

Mr. Stewart, on behalf of the Toronto Hydro-electric System explained that he had already laid plans to advertise Hoover suction sweepers exclusively in the newspapers during the month of March, and assured the Hoover representatives that they would receive every co-operation in carrying out the plans suggested.

Mr. McNeilly said that as far as the Murray-Kay company was concerned, everything would be done to help the Hoover representative secure his quota, and he felt sure that more machines than had been suggested would be sold in their store during the month of March.

Mr. Bushall also assured the Hoover representatives of the Toronto & Niagara Power Company's support in their campaign, and in closing offered on behalf of those present, a hearty vote of thanks to the Hoover Company and their representatives for the dinner which they had all enjoyed.

The party broke up, with the singing of The Maple Leaf and God Save the King. Those present were:—

The Robert Simpson Company, Limited—E. C. Budd, G. A. Damp, J. C. Cameron, A. Pollock, T. F. Phillips, R.

Bateman, R. Sinnett, J. L. Quigley, J. J. Tetterson, John Todd, T. S. Johnstone, R. H. Johnston.

The Toronto Hydro Electric System—A. W. J. Stewart, I. Washburn, W. S. Hutchins, George Davis, H. J. Welch, E. H. Ryan, J. H. Hughes.

The Murray Kay Company, Limited—H. R. McNeilly, J. A. Sheldon, Chas. E. Long, A. E. Gravett, Stanley Martin, G. Mullins, Percy Westcott, F. F. Smith.

The Toronto & Niagara Power Company—W. S. Bushell, C. E. Heath, G. L. Riche.

The Hoover Suction Sweeper Company—Sales Manager, Thomas F. Kelly; District Manager, J. Skelton; Resalemen—F. Ritz, R. N. E. Connor, H. J. Moore, C. E. Lillie.

Four Kinds of Electrical Contractors

"There are four kinds of electrical contractors," said Louis Kalischer, former chairman of the metropolitan group of contractor-dealers' associations of New York City, in an address before a gathering of electrical men of Brooklyn some time ago.

"First, there is the contractor that knows the cost of the work and the cost of his overhead.

"Second, the one that has a general knowledge, but does not know what his cost of doing business is.

"Third, there is the fly-by-night concern which has an 'angel' to back it. These usually last about a year—as it takes about that length of time to complete the various jobs—the manager usually makes one job wash another. The time, also, depends on how much the 'angel' can be separated from. I know of one that let go of $50,000 before he was satisfied to call 'quits.'

"Fourth, there is the erratic bidder, who on some work is very low, and on others is very high. He causes the most trouble. His high bid is laughed at and put into the W.B. file; but his low bid, if it is considered at all, is sometimes used to sandbag the man who had put in a legitimate estimate for the work to be done. He is the contractor who always tells you that the successful bidder is going to lose money on the job because he imagines the work was awarded at a figure lower than his."—Elec. Con.-Dealer.

Do You Watch the Little Things?

It is the little things which count, every time. Attractiveness, in window and store display should be the one big aim of all dealers in electrical goods. As an aid to attractiveness, the little things count equally with the big things. It seems to be a law of human nature that whereas a whole untidy store will simply be given a passing thought by a customer, a store with just a few little things wrong will irritate. Such an irritation is almost a sure sign of a no-repeat sale.

Take a few examples of little mistakes which interfere with sales:—

A certain electrical dealer the writer visited a few days ago spoiled what might have been a good window display, by three little faults. In the first place he formed a background to his window, of tissue paper but in hanging it, he stretched it out to its full capacity. He also used common string to hold up the rod on which the paper hung, and in addition made untidy knots. Second; along the front of the window was stretched a strip of paper ribbon—It was too short. Third; all the paper decorations were faded. The general appearance was that of cheapness: cheap string; skimpy decorations; and poor material. What might have made a very good appeal to the passersby, was spoiled by want of thought.

Another instance is that of a store, neat and attractive but spoiled because a few small fittings, and a coil of wire, were thrown on the floor in a corner. Just carelessness, or thoughtlessness, but giving a bad impression to customers.

One more example is that of a store with a neat window display, good showcase tastefully dressed and ceiling hung with a choice assortment of fixtures. The shelves behind the counter, however, contained cartons of small fittings. When replacing, after making sales, the dealer had not taken the trouble to neatly close the cartons, with the result that the shelves gave a very ragged appearance. Cartons partly open, little pieces of tissue paper hanging out of small boxes, and an odd fitting carelessly thrown into the corner of a shelf. Untidiness; and all for the want of a few minutes' time spent in tidying, after a customer had left the store.

All these are but little things and they take but little time to remedy. They detract a customer's, or prospective customer's attention from the window display, or from goods shown in a showcase. This gives a bad impression.

A prospective customer seeing a store of this kind might possibly argue something like the following:—

I want some work done in my home but I don't think I care to give the work to Mr. So-and-So because he appears careless of the little things, and therefore may be just as careless in doing work for me. I might as a result have endless trouble and expense in the future, from little repairs made necessary through his careless work.

The little things count every time, and it is a sure thing that the man who is careful about the little things, will be equally careful about the bigger things.

Better Commercial Lighting

Never in the history of electricity has more attention been paid to commercial lighting than at the present time. Business men are beginning to realize the importance of plenty of light—good light—and the lighting unit that promises high efficiency, meets the approval of discriminating buyers. The two modern units shown herewith are being manufactured by J. H. Edmunds & Co., electrical fixture manufacturers, 225-227 Richmond St. W., Toronto. These units are known as the "Britelite" and the "Edmundslite." Both are designed and constructed, on approved scientific principles, resulting in the maximum of light with the minimum of current and practically eliminating absorption and shadows. This means efficiency and economy, important factors in the field of illumination.

Britelite

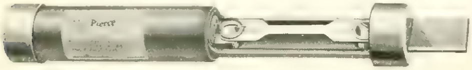
Edmundslite

In addition to the units described, a variety of the products of the busy factory are displayed at the above address and being electrically connected can be seen to the best advantage. These include the latest designs in electric fixtures, ranging from those fitted for the drawing room of the mansion, to the less elaborate, and inexpensive types suited to the home of the cottager. Their new electric fixture catalogue will be ready in about three weeks.

The Pierce Renewable Fuse

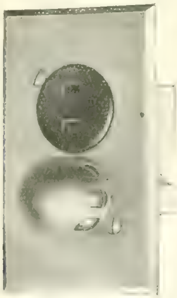
The illustration shows the Pierce renewable fuse, manufactured by the Pierce Fuse Corporation of Canada, Limited, Bridgeburg, Ont., in both ferrule and knife-blade types.

One end of the fuse link is slotted at the end, and the other is slotted at the side, thus making it convenient for inserting in position, it only being necessary to loosen the two screws, which, when tightened, hold the fuse in place. In a nutshell, to refill the ferrule type fuse unscrew the cap, pull it apart, loosen the screws, insert the new fuse link, tighten the screws, and screw on the cap. To refill the knife-blade type, simply pull it open, loosen screws, insert the new fuse link, tighten the screws and close. It will be seen that the fuse cannot be inserted in the clips unless it is fully closed, thereby making it a safe one to handle. The Pierce fuse, it is claimed, can be removed from the circuit, renewed and restored to duty in 15 seconds; so simple is the operation that a screw driver is the only tool required. A venting arrangement is provided to take care of the gases that accumulate when a fuse is blown, thus minimizing the charring of the fibre or the freezing of connections on heavy shorts. The screened vents permit free circulation of air which have a cooling effect on the fuse. Pierce fuses are made for 250 to 600 volts, ranging from 3 to 600 ampere capacity.



Combination Spartan Receptacle and Warning Light for Single Switch Box

It is a recommendation of the National Electrical Code that in connection with smoothing irons, sad irons and other heating devices that are intended to be applied to combustible articles, there should be a warning signal to indicate that the current is flowing. The Bryant Electric Company of Bridgeport, Conn., have just placed on the market a device which is a combination of their standard Spartan flush receptacle and warning light. The two are combined in a single porcelain which can be installed in a single switch box. The Spartan receptacle will receive any of the numerous Spartan and other standard parallel bladed caps. The 2-candle power, 125 volt, candelabra base warning lamp, which is connected in parallel with the receptacle, is protected from mechanical injury by a perforated brass cage. When occasion requires the lamp can be renewed by simply removing the face plate of the device. The connections in the receptacle are such that the lamp automatically lights up when the attachment plug cap is inserted, thus doing away with the necessity of a snap switch which is frequently a component part of devices designed for the purpose. The use of a device of this kind is not only advisable from the fire prevention standpoint but also from the standpoint of economy in connection with the less hazardous but widely used domestic appliances such as percolators, toasters, chafing dishes, curling irons, etc., since it tends to diminish the unintentional and undiscovered consumption of current. All internal connections are made complete at the factory so that the device can be substituted for any receptacle at present installed, by simply attaching the line wires to the two terminals that are provided.



Combination Receptacle and Warning Light

Preliminary Notice!

A Great Co-operation Meeting

will be held in the City of Vancouver

On Monday and Tuesday, May 31 and June 1

William L. Goodwin, Samuel A. Chase, Harry Kirkland, and it is hoped W. H. Morton, J. M. Wakeman and others will be present.

Manufacturers, Central Station Men, Electrical Inspectors, Jobbers, Contractors, Dealers and every section of the Electrical Industry will be represented.

If you are an Electrical Man you are welcome

For particulars write the Secretary,
Vancouver Association of Electrical Contractors & Dealers
422 Pacific Building, Vancouver, B.C.

Montreal Armature Works Calendar

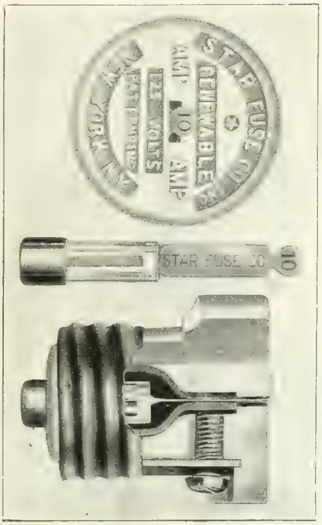
The Montreal Armature Works, Limited, are sending out an attractive monthly calendar to an extensive list of their customers and prospective ones. The February issue is an informative, attractive little publication with a humorous lithograph on the flap and inside a good live selling talk on the company's business. The Montreal Armature Works serves some of the best known manufacturers in Canada, and much of the largest apparatus in the country has been designed, constructed, installed and operated under the supervision of their experts.

Mr. R. A. Brown, who has been superintendent of the Calgary Electric Light Department for many years has been appointed superintendent of the Municipal Railway System at Calgary. Mr. Thos. H. Macaulay, who held this position as announced in our issue of Feb. 15, has gone to the New Brunswick Power Company, St. John, N. B.

The Crouse-Hinde Company of Canada, Ltd., are distributing a folder illustrating safety panel boards and cabinets. Shock is impossible with this equipment when the main door is locked; the fuses and main switch are quickly accessible to authorized persons.

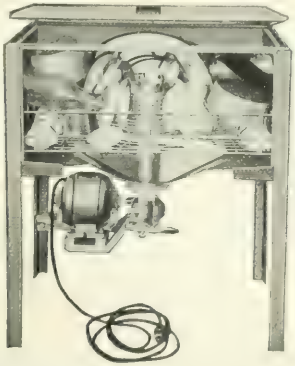
The "Star" Renewable Fuse Plug

The Star Fuse Company are placing on the Canadian market their one-piece renewable fuse plug. This fuse can be renewed without taking the plug apart. A turn of the screw releases the inner cartridge and makes possible the removal of the blown cartridge and the replacing of a new one. The illustration herewith shows a top view of the plug, a view of the inner cartridge and a sectional view of the plug.



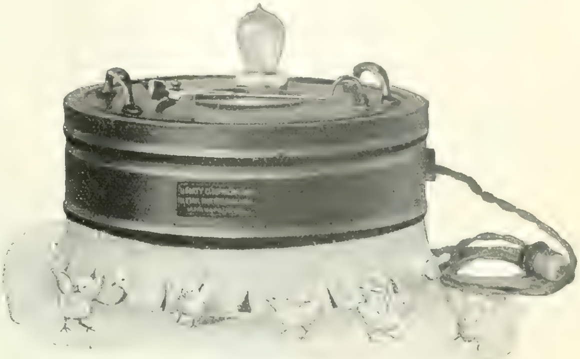
Mermaid Electric Dish Washer

We illustrate the Mermaid Electric Dish Washer herewith. As may be seen, there is a sigle portable tray designed to accommodate all flat china, glassware, cups, bowls, odd-shaped dishes, platters, cutlery and pots and pans of ordinary size. It is said that eight quarts of water are required for washing or rinsing. The tank is rectangular in shape and fits nicely into corners or against the wall. It is said that it requires from two to three minutes to wash the dishes and only a few seconds for rinsing. The cost of operation would be negligible. The machine is manufactured by the Wolcott Manufacturing Co., of Hartford, Conn.



The "Lectro-Hatch"

R. E. T. Pringle, Limited, are distributors for Canada of the machine shown herewith, called the "Lectro-Hatch." There are various sizes of this machine, varying in capacity from 100 eggs up to 600 eggs. These machines are manufactured by the Electric Controller Company, of Indiana. The same company manufactures an electric brooder. This machine possesses all the advantages claimed for electric heat over other forms of heat in hatching eggs—and then some. The temperature is controlled by a regulator, which has been given the trade name of "Regutroller," which shuts the current off if the temperature shows a tendency to rise and allows more current to flow if the temperature falls. This automatic system of control works so perfectly that all one has to do is turn the eggs occasionally. It is claimed that 75 per cent. of the fertile eggs is not an unusual hatch with this machine.



Combination Electric Dishwasher and Sink

Electric washers are solving the clothes washing problem so satisfactorily that inventors are now giving their immediate attention to the dish washing problem in the home. Machines are available for washing the dishes, but they are separate from the sink, where dishes have always been washed.

Now, comes a clever combination of electric dishwasher and sink, in which the dishwasher has been incorporated as part of the sink, and placed on the market by a Chicago company. Two perpendicular revolving paddles throw the water between the dishes which remain stationary, thus eliminating breakage.

This domestic size outfit is operated by a 1/4 h.p. motor with an attachment cord that fits any lamp socket. The motor can be used for making ice cream by replacing the dish frame with a special freezing can. This combination is also made in large size for use in hotels, restaurants and hospitals.

Power to Erect Poles

In order to meet the wishes of the City of Montreal, the Quebec Legislature have given power to the Quebec Public Service Commission by which no company can erect a line of poles for the carrying of wires or other purposes in a street on which a line of poles already exists, without the sanction of the commission, and the latter body can compel companies to put their wires on the same poles, if application for such is made by a municipality or a company.

Conduits for Interior Construction

The Conduits Company,. Limited, are distributing an interesting booklet entitled, "Conduits for Interior Construction, Galvaduct and Loricated." The merits of these two standard lines of interior conduit are discussed and illustrated. The booklet also contains a quantity of interesting information, such as, for example, conduit sizes for wires and cables, standard symbols for wiring plans, decimal equivalents, etc.

The Victoria Electric and Supply Company, Limited, Toronto, are converting the second floor of their premises at 77 York Street, Toronto, for the manufacture of electrical supplies

The Delta Star Electric Company have issued an interesting folder entitled, "Bring Central Station Electric Current to Your Farm." The pamphlet outlines th eadvantages of electricity on the farm, the various uses to which it may be put and the equipment available for supplying it.

The Montreal Tramways Company have closed a contract with Mr. F. R. Grothe, contractor, Montreal, for the necessary excavation for, and the construction of the substructure of the new Cote Street sub-station, Montreal. This sub-station will be equipped with a 2,000 kilowatt rotary converter, for which an order has been placed with the Canadian General Electric Company, Limited. It is expected that the contract will shortly be placed for the erection of the super-structure, and for the other equipment in connection with the new station.

New Firms

A new firm under the name of Union Electric Ltd., has been incorporated, with headquarters at Regina. They are capitalized at $25,000.

A new company has been incorporated under the name of The Manse Grove Telephone Company, Ltd., for the purpose of establishing and operating a telephone system within the township of Eldon, Ont.

Wonderphone, Ltd., of Vancouver, is a firm lately incorporated for the purpose of manufacturing telephone and telegraph instruments, and all kinds of apparatus necessary for such instruments.

Mr. J. E. Day has recently opened a store for the sale of electrical goods, and electrical contracting, at 407 Spadina Ave., Toronto.

Mr. James Lamont, electrical contractor, of 880 Bloor St. W., Toronto, has recently opened an additional store at 810 St. Clair Ave., Toronto, for the sale of electrical goods.

The Pioneer Telephone Company, Ltd., with headquarters at East Oxford, has been incorporated to own and operate a telephone system within the townships of East and West Oxford.

The Sebright Telephone Company Ltd. is a new company with headquarters at Sebright, Ont., incorporated for the purpose of owning and operating a telephone system.

The South Norfolk Telephone Company, Ltd., has been incorporated, with headquarters at Waterford, Ont., for the purpose of owning and operating a telephone system through several towns and villages in the neighborhood.

The death occurred recently of D. S. Robertson, purchasing agent of the Montreal Tramways Company. The late Mr. Robertson was sixty-nine years of age, and was formerly associated with thte Grand Trunk Railway at Point St. Charles.

Current News and Notes

Arnprior, Ont.

New electrical machinery is to be installed in the factory of the New Era Clothing Company, Arnprior.

Barrie, Ont.

Estimates are to be secured from the Hydro-electric Commission for the installation of an electric system in Innisfil Township, Ont. A by-law will be submitted later.

Fort Matachewan, Ont.

Tenders are to be called as soon as plans are completed for the contemplated power development at Fort Matachewan, Ont. Work is expected to start in September. Sutcliffe & Neelands, New Liskeard are engineers.

Fort William, Ont.

The manager of the Fort William light and telephone department has been authorized to purchase one type F-11 battery for the telephone department, and a supply of electric meters not exceeding three hundred.

Tenders will be called for shortly for the rebuilding of the car barn recently destroyed by fire.

Fredericton, N. B.

Fredericton is buying additional machinery for its electric lighting plant.

Georgetown, Ont.

Georgetown has made a request to the Hydro Commission for an additional block of 300 h.p. to meet the increased needs of the manufacturers.

Halifax, N.S.

Mr. Colpitt, electrical engineer for the City of Halifax, has prepared a scheme for street lighting that city. The plan involves the installation of 850 lamps, instead of 440 as at present.

London. Ont.

The Public Utilities Commission of London, Ont., have completed their arrangements for absorbing the plant of the Helena Power Company. It is reported that the sum agreed upon is $30,000, to be paid out of the revenue in six annual installments.

The London city council contemplates installing a new switchboard in the Central Fire Hall, at a cost of $15,000.

Montreal, Que.

A resolution has been passed by the Montreal Administrative Commission to call for tenders for two electric pumps of a capacity of 30 million gallons.

Norwood, Ont.

The ratepayers of Norwood, Ont., have passed a by-law authorizing the borrowing of money for the construction of a Hydro system.

Ottawa, Ont.

The City Council of Ottawa have passed a bill to be submitted to the legislature to enable the city to acquire, extend and operate the Ottawa Electric Railway system.

Tenders are called by the Ottawa city council for a 75 h. p. electric motor for the asphalt plant. Tenders will be received until March 25th.

Ripley, Ont.

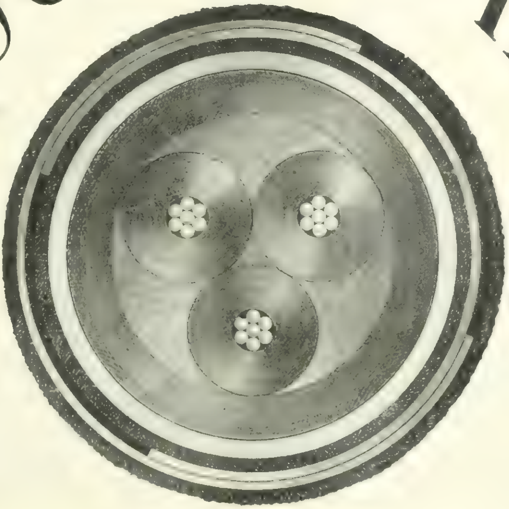
The village of Ripley carried a by-law for borrowing the sum of $15,000 four Hydro by a vote of 109 for and 4 against.

Regina, Sask.

Baird Bros. who for the past six years have been operating with headquarters at Oxbow find their business growing so fast that they have found it necessary to form a company which has been incorporated with headquarters at Re-

PHILLIPS'

ARMOURED CABLES



No. 2 B. & S. 3-Conductor 25,000 Volt Cable

Paper Insulated, Lead-covered, Double Steel Tape Armoured

Supplied to the Order of
The Quebec Railway, Light, Heat and Power Company

Eugene F. Phillips Electrical Works, Limited
MONTREAL

Branches : Toronto, Winnipeg, Regina, Calgary, Vancouver

gina, under the name of Baird Bros. & Co. Ltd. They will carry on a business of building rural telephone lines throughout the southern section of the province, and are anticipating putting five new crews in the field.

Stratford, Ont.

Stratford is about to install a new electric lighting system in its Court House.

St. Raphael, Que.

St. Raphael, Que., have awarded contracts to the following firms in connection with the new power house, dam, and water power: Two 850 kv.a., 3 phase, generators and transformers, to the Canadian Westinghouse Co. Hamilton, Ont., at a cost of $47,000; for two 1,000 h.p. horizontal water wheel tubines complete with governors and feeder pipes to A. R. Williams Machinery Co., Ltd., Toronto, at a cost of $29,000.

Vancouver, B. C.

It is understood that large financial interests have taken over the Bridge River Power Company at Vancouver. The old company possessed water rights capable of developing 125,000 h.p. It is said that the new company intend to develop this power at once.

Wardsville, Ont.

A by-law is to be submitted to the ratepayers of Wardsville, Ont., for permission to install Hydro-electric system, at a cost of $7,000.

Waterloo, Ont.

The Hydro-Radial By-law was carried by the ratepayers of Waterloo, Ont.

Wolfville, N.S.

Wolfville, N.S., is now supplied with electric light from a Hydro power development completed at Gaspereaux. This replaces a steam plant owned by the town.

Generator Contracts for Queenston

The Hydro Electric Power Commission of Ontario announces the letting of a further contract for two 45,000 kv.a. generators for their Queenston development to the Canadian General Electric Company; also one 45,000 kv.a generator to the Canadian Westinghouse, also, fifteen 15,000 kv.a transformers to step up from 12,000 to 110,000 volts. We believe this is the largest order for transformers that has ever been placed at one time. It will be remembered that a contract was let to the Canadian Wsetinghouse some time ago for two kv.a generators, so that the total generating capacity under contract is now five 45,000 kv.a units.

Hints on Working Aluminium

The British Aluminium Company now have available for distribution a supply of small booklets, entitled "Hints on Working Aluminium." One of these booklets is devoted to aluminium sheet, another to aluminium circles and a third to aluminium tubes. They contain a quantity of valuable information.

Cochrane, Stephenson & Co., Ltd., 602 Avenue Building, Winnipeg, are factory representatives for Western Canada for W. H.Banfield & Sons. It is also announced that Goodwin & Co., 14 Bedford Road, London, W.C.I., are representatives for Great Britain.

In our last issue, in our reading notice referring to the Ferranti Meter & Transformer Mfg. Co., we stated that Mr. Fred Rowntree was secretary and assistant manager. We are advised that this should have read, F. W. Rowntree, secretary, and that the office of assistant manager has not been created.

NO DELAY
Shipped same day as order received
The kind of Light Business Men are looking for!

The "Britelite" The "Edmundslite"

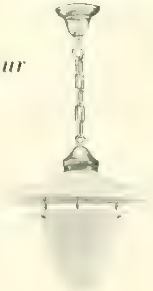
" Let us do your Lighting"

Mr. Contractor-Dealer:

Will you be the first to install these units in your district?

Write for descriptive folders, price lists, discounts, and electrical fixture catalogue. It will pay you!

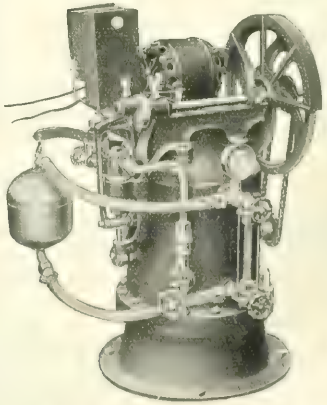
J. H. EDMUNDS & CO.
225-227 Richmond St., W. Toronto



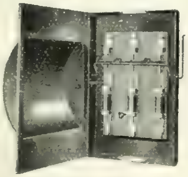
Century
FRACTIONAL HORSE POWER
REPULSION START INDUCTION
SINGLE PHASE MOTORS

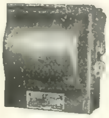
1/10 to 1/4 Horse Power require a starting current of not more than 275% of full load current. This is of particular value, since it helps to reduce voltage fluctuation on lighting circuits and a fuse can be used for starting which will protect the motor while running.

OTHER SIZES UP TO 40 H.P.
CENTURY ELECTRIC COMPANY
ST. LOUIS, MO., U.S.A.
Montreal — Toronto — Winnipeg — Vancouver



H.P. Motor geared to a soda water carbonator





-INTERNATIONAL-

Stand back there! Make way for

Another Famous Line

Square "D" Switches

Charlie Keeling says "Square D" means "Square Deal"

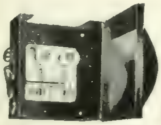
and we believe he's right, and anyhow They're *made in Canada*

That's something, which counts all the time;—

Get a catalogue—

Our Galaxy of Celebrities are still with us

International Machinery & Supply Co.
421 St. James St. Limited MONTREAL, Que.
—The Electrical House—



Dealers and Central Stations

Doing anything on Electric Ranges? If so you want to know all about the

AQUA

Electric Water Heater

One of the chief worries of a prospective range customer is: "How am I going to get hot water?" It is absolutely illogical for the salesman to suggest a gas heater. The Electric Kitchen is with us now, and is here to stay.

You need not worry about the hot water question. Just show your customers the Aqua and demonstrate to them that it heats water

INSTANTANEOUSLY

And another sale will be made with more profit to you—both on the sale and the installation.

EVERYBODY NEEDS THEM

The LIVE Dealers and Central Stations are already interesting themselves in the Aqua. How about YOU? Want particulars? Free for the asking. Get busy now.

MORA & MENDOZA
Canadian Distributors
111 Broadway - - NEW YORK, N. Y.

Condensed Department

Publisher's Notice

Advertisements under "Situation Wanted or "Situation Vacant" are charged at two cents a word per insertion, minimum charge 50 cents.

Advertisements for tenders, equipment, wanted or for sale, etc., or miscellaneous, are charged at $2.80 per inch.

All advertisements must be in the publisher's hands by the 10th or 23rd of the month to insure insertion in the subsequent issue.

SITUATIONS VACANT

Wanted

Experienced Demonstrator on Electrical Ranges and Appliances. Apply Box 175, Electrical News, Toronto, Ont. 6

Wanted

Experienced meter repair man to take charge of repair and maintenance of approximately 8,000 meters. None but experienced men need apply. State experience in application. E. W. BULL, Supt. Light and Power Dept., City of Regina 6

Electrical Power House Superintendent

Wanted for a 12,000 H.P. hydro-electric plant now being built. Location about 18 miles from the town of Chicoutimi, P.Q., and eight miles from nearest village. Salary $2500 to commence, with free house and light. Applicant should be married man, steady and of good habits, with experience in the operation and maintenance of large waterwheels and generators, and able to handle men. Ability to speak both French and English an advantage. Apply Box 187, Electrical News, Toronto, Ont 6-7

Sales Opportunity

Canadian agents are wanted for selling in all Canadian cities one of the best Renewable Plug and Cartridge Fuses on the market. A description of our Plug Fuse is on page 45 of this issue. Lamp Salesmen will find it a very profitable side line. In writing to us give reference, also state territory you are capable of covering.

STAR FUSE CO., INC.,
290 Church Street,
6 New York City

SITUATIONS WANTED

SALES ELECTRICAL ENGINEER—A1—widely experienced, energetic, enthusiastic—wants to act as traveller for reliable firm. Knowledge of men and business. Both languages. Write Box 156, Electrical News, Toronto. 5-6

SITUATION WANTED—Thoroughly experienced and competent returned officer with eighteen years of practical experience in Construction, Operation and Managing Electrical and Civic Developments, is open for a position as Manager or Superintendent of Power Company or Civic Utilities in growing town. Reply Box 164, Electrical News, Toronto, Ont. 5-6

Wanted

Good second hand ¾ or 1 H. P. single phase motor for Hydro power. Quote prices to

The St. Marys Wood Specialty Co.,
6 St. Marys, Ont.

For Sale

2,500 ft. of 1,000,000 C.M. Standard Triple Braid Weatherproof Copper Cable

H. MUELLER MFG. CO., LTD.,
6-7 Sarnia, Ont.

A. H. WINTER JOYNER, Ltd.
Engineering Specialties
TORONTO MONTREAL
Representing
Weston Electrical Instrument Company.
The Bristol Company.
G & W Electric Specialty Company.
General Devices & Fittings Company.
Pemco (Philadelphia Elec. & Mfg. Co.)

Propose an Engineering Building for San Francisco

The Engineers' Club of San Francisco has appointed an engineering building committee which is preparing a report on the plan of getting "all the engineering interests of the city together under one roof." The investigation is to determine whether the engineering professions and trades have sufficient common interest in such a plan to warrant the committee in drawing up a definite proposition for prospective building owners.

General discussion of the idea at society and committee meetings has materialized into a suggestion that the building have 10 or 12 storeys, the two top floors to be occupied by the engineers club, the body of the building to be arranged for offices of engineers, the technical papers, and of merchants dealing in engineers' equipment, supplies and materials. The suggestions include providing an auditorium large enough for joint meetings of the engineering societies. The first action of the committee was to circularize all engineers of San Francisco asking for a statement as to whether they would be interested in rental space in such a building located in the vicinity of the Palace Hotel, what floor space each one occupied and what maximum price per square foot could be considered. When the returns from this letter have indicated the general sentiment, further plans will be discussed, and formulated accordingly.

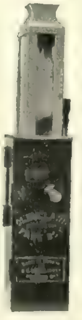
PETRIE'S LIST
of NEW and USED
MOTORS

No.	H.P.	Phase	Cycle	Volts	Speed	Maker
1	100	3	25	550	480	Westg
1	75	3	25	550	750	Cr.-Wh.
1	60	3	25	550	750	Cr.-Wh.
2	52	3	25	550	720	Lancashire
2	50	3	25	550	720	Westg.
1	40	3	25	550	725	Harland
1	35	3	25	550	750	Cr.-Wh.
1	35	3	25	550	720	Westg.
1	30	3	25	550	1500	Tor. & Ham.
1	25	2	60	220	945	Westg.
1	20	3	25	550	750	B. G. E.
1	15	3	25	550	1450	Westg.
1	15	3	25	550	1400	Lancashire
1	15	3	25	550	750	Lincoln
1	10	3	60	220	1120	Westg.
1	7½	3	25	550	1500	Lang.-Dav.
1	7½	3	25	550	725	Westg.
1	7½	3	25	550	710	C. G. E.
3	4	3	25	550	1400	Excelsior
1	3	3	25	550	700	Westg.
1	1	3	60	550	1700	Westg.
1	1/6	1	60	110	3400	Diehl.

Write Us for Prices

H. W. PETRIE, Limited
Front St. West - Toronto, Ont.

Hart Storage Batteries
—FOR—
Electrical Power Stations, Telephones, Fire Alarm Systems, Isolated Electric Plants, Etc.
MADE IN CANADA
—By—
The Canadian Hart Accumulator Co, Ltd.
Sales Offices — Drummond Building Montreal
Works:— St. Johns, Que Canada



The Cleveland Fare Box
Prevents Mistakes

It is the one sure method of collecting fares without possibility of mistakes or losses in any way.

THE CLEVELAND FARE BOX is an important advancement in street car service to the public in safeguarding the interests of the municipality or company, and in saving time and labor.

Write for further important facts regarding this practical and valuable means of collecting fares.

M. C. McElligott, *Manufacturer*
PRESTON, CANADA

Agent for the Arthur Power Saving Recorder for Western Provinces

Canadian Representative, Universal Lubrication. Tulc.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 309 Broadway
CHICAGO - - - 1413 Gt. Northern Bldg.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS
Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS
The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.
Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.
Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 **Toronto, April 1, 1920** **No. 7**

Ventilation a Physical Problem—Vital Importance of Electric Fan

Numerous experiments made during recent years all go to show that the ill effects of "bad air" are not due nearly so much to chemical as to physical characteristics. For example, these experiments show that subjects living in an air-tight cabinet and required to re-breathe the air until they begin to show signs of depression and dizziness, are almost immediately revived when the air in the cabinet is put in motion by means of a fan, without any chemical alteration whatever being made in the air. The explanation is that the ill effects in vitiated atmospheres are due to heat stagnation in the body and that the moisture of the atmosphere and its stillness are responsible for the effects produced. The result of stirring up the air removes the excess moisture from the immediate neighborhood of the body and allows the body to throw off its heat more rapidly.

"These experiments should have a very direct bearing on the greater use of electric fans in our offices and homes, for they demonstrate that fresh air is not so essential as air in motion. This may come as a shock to some of our so-called "fresh air fiends," but to many people whose coal bills are troublesomely large, but who, in spite of this fact, are endeavoring to keep themselves in a healthy condition by allowing plenty of fresh air in their offices and homes, it might well come as a welcome relief. One example was recently quoted in a gymnasium, where a saving of 40 per cent. in coal consumption was obtained by re-circulation of air instead of introducing fresh cold air."

The electric fan should, according to these statements, become an all-the-year-round household appliance, for not only will it keep the air in motion, but, at the same time, it equalizes the temperature throughout the room. It is well known that the temperature of the upper strata of a room frequently is very much greater than the temperature of the lower strata, so that our feet are cold when our heads are hot. It has often been argued that the electric fan would justify its constant use, therefore, for the sole purpose of equalizing the vertical temperature in a room. When to this is added the further advantage of economizing on coal consumption, dealers in electrical equipment seem to have two unanswerable arguments for urging their customers to use electric fans every day in the year.

Inventions Night at American Institute Meeting—Keen Competition for Prizes

The Toronto Section of the American Institute of Electrical Engineers introduced a very novel innovation at their meeting on Friday, March 19th, at the Engineers' Club. Instead of having a formal paper on an announced subject, the meeting took the form of a competitive presentation of original inventions not covered by existing patents or patent applications. In accordance with an announcement previously made to the members, the Toronto Section had prepared lantern slides for any of their members who wished to take part in the contest.

In opening the meeting, Mr. A. B. Cooper, Chairman of the Section, appointed the following committee of judges: Mr. W. G. Gordon, Chairman, Mr. W. A. Bucke, Mr. E. T. J. Brandon, Mr. Wills Maclachlan, Mr. Clarence Hookway.

The meeting was then turned over to Mr. P. A. Borden, who had been responsible for the arrangements for the meeting, preparation of slides, etc.

A number of interesting and highly technical ideas and inventions were presented by the various members of the Section, all of which were the subject of very pointed discussions.

The first prize, a very attractive bed lamp, was awarded to Prof. H. W. Price, of the University of Toronto. Prof. Price showed a very artistic slide, demonstrating the possibility of developing high frequency and high voltage electricity over extended periods, applying one of the first known sources of electricity but utilizing more recent adaptations in the way of automatic regulators, etc. A discussion on Prof. Price's invention brought out some very helpful suggestions with regard to spare parts for the prime mover and other suggestions looking toward the continuity of service.

The second prize was awarded to Mr. H. C. Don Carlos, of the Ontario Hydro-electric Power Commission. Mr. Don Carlos outlined an entirely new basis method of high voltage transmission, and showed the adaptability to local conditions governing transmission in Ontario. Mr. Don Carlos' scheme entirely eliminates the transmission line towers and effects a considerable reduction in the distance of transmission, in some cases amounting to 40 per cent. The study of the scheme as applied to one particular system showed a saving of upwards of one million dollars in eliminating the expense of right-of-way and transmission line towers and in reducing the cost of copper, insulators, etc. The successful operation of this type of transmission line depends on several special features still more or less in the experimental stage. In connection with this type of transmission, Mr. Don Carlos has developed a special type of automatic switch which introduces a high resistance in the circuit under short circuit conditions, thereby eliminating one of the main difficulties of high tension switching involving surges and line transients.

The third prize was awarded to Mr. P. A. Borden, of the Strachan Avenue Laboratories. Mr. Borden developed an economic unit of power based on apparent success in some initial experiments in the charging of the electrolyte in storage battery cells. This charged electrolyte was subsequently dehydrated, still retaining the basic energy. Mr. Borden called his concentrated unit the "dynaloid" and demonstrated the many uses to which this concentrated energy could be put under emergency conditions.

May 16 - 22 a Week of Safety

The Executive Committee of the Ontario Safety League has approved the outline of a plan drafted by a sub-committee of the League by which Toronto will be treated to a week of safety. The week of May 16th to 22nd has been designated "Safety Week" and in that week the Safety League and the various organizations co-operating, plan an intensive drive against accidents.

During Toronto's "Safety Week" the various committees plan to teach accident and fire prevention to every man, woman and child in a spectacular educational campaign in which various forms of publicity will be used. The public will be reached by means of posters, bulletins, bill boards, street-car cards, letters, advertisements, meetings and Safety shows and given a liberal education in safety.

Sub-committees of the Safety League will cover such subjects as:—publicity, bulletins, motion pictures, schools for industrial safety, statistics, boy scouts, women, traffic, schools and colleges, etc., etc. The various days of the week have been specially designated—Safety Sunday, with special sermons in the churches: Monday is Careful Day for Motorists: Tuesday will be Careful Day for Street Car Men: Wednesday is set aside for School Safety: Thursday will be At Home Day for Safety: Friday is to be called Careful Day for Pedestrians. and the slogan for Saturday will be "Safety for All, All for Safety."

Intensifies Heat Four Times?

An advertisement recently appeared in one of the Toronto dailies—and possibly in other papers—announcing an invention in the way of a new electric heater. The announcement is evidently for the purpose of selling stock. This in itself is quite legitimate, but it would be well that the Canadian electrical public should look into this appliance before investing heavily in the stock. For example, one of the statements is that "the basic principle of the invention is a specially constructed resistance heating unit, and is a composition of several ingredients that, under hydraulic pressure and other processes, forms an almost indestructible plate that intensifies heat approximately four times." To say the least, this is indefinite enough to be muddling, but if the most evident interpretation is given, viz., that this unit produces approximately four times as much heat as other electric units consuming the same amount of current, it is untrue. Electric heaters at present on the market are practically 100 per cent. efficient, and it would be useless to lead the public to expect anything better in this direction. Statements of this kind are more likely to be made through ignorance than through any desire to mislead. In any case, the public can lose nothing by investigating the truth of the statements contained in this advertisement.

The Walkerville Hydro-electric system showed a profit of $32,954 for the year 1919. New consumers were added during the year as follows: Domestic, 2,347; commercial, 235; power, 73. The retail store turnover for the year was approximately $69,000, an increase over the previous year of about 150 per cent. Mr. M. J. McHenry is the manager of the system.

Big Saving in Power-Factor Correction

An interesting item, written by Mr. Carl Fichtel, electrical engineer of the Calumet & Hecla Mining Company, Michigan, and published in a recent issue of the Electrical World, describes a condenser that has been made available for power-factor correction by the conversion of an old discarded engine-driven generator. The generator is a 440-volt machine rated at 1,204 amp. and 150 r.p.m. and had been driven by a rope-drive drum. The space made available by the removal of this drum was used for mounting the 440-volt, 158-amp., 150-r.p.m. starting motor. The motor has a special squirrel-cage rotor keyed onto the 16-in. shaft of the generator.

The condenser is operated with a turbo-generator which carries a connected mine and mill load of 10,500 h.p., of which 3,800 h.p. is synchronous load and the remainder is induction-motor load. The following figures indicate that with a load of 6,300 kw. and the condenser running idle the power factor of the system was 0.84, while with an excitation of 160 amp. and 1,250 amp. on the condenser the power factor was raised to 0.91. The total cost of making the change was only $2,500.

	Condenser			Exciter		Turbine Load		
	Amp.	Volts	P.F.	Amp.	Volts	Kw.	Volts	P.F.
No load ...	0	464	0.95 lag	104	115	6,300	4,000	0.84
Full load...	1,250	480	0.93 lead	160	120	6,300	4,000	0 91

Another Oil-Electric Yacht

The Westinghouse Electric & Manufacturing Company announces that it has been awarded the contract for supplying the electrical propulsion equipment for the yacht "Guinivere," which is being built by George Lawley & Son Corp., Neponset, Mass., for a prominent member of the New York Yacht Club. The "Guinivere" was designed in every detail by A. Loring Swasey. She is to be a three-masted schooner, with oil-electric auxiliary power, and will be 195 feet overall, 150 feet water-line, and 32-1/2 in. beam. Her draft is 15 feet and her displacement 642 tons. Her power plant is to consist of two 6-cylinder, 350 h.p. model 24-A Winton Diesel oil engines of 225 r.p.m., each of which is directly connected to a 225 kw. 125 volt, direct-current generator. Each engine drives also, through a chain, a 15 kw. exciter, which supplies the field current for its generator. and the propeller motor, and, in addition, power for other purposes. The propeller is connected through a clutch to a 550 h.p., 250 volt motor of 220 r.p.m. Normally the two generators connected in series will supply current to the propeller motor, but the control is so arranged that either can be used alone to operate the propeller at reduced speeds or in case of emergency.

60,000 kv. a. German Generators

In a paper recently presented before the 59th general meeting of the Verein Deutscher Ingenieure, by Professor Reichel of the Siemens-Schuckret-Werke, on "The Limits for the Time Being, in the Construction of Electrical Machinery," it was stated that transformers up to 60,000 kv.a. had been built in one unit; rotary converters up to 5,000 kw.; electric generators up to 60,000 kv.a. The author also stated that alternators with an output of 150,000 kv.a. appear quite feasible, the only limits imposed being the difficulties of transportation from factory to power house site. The 60,000 kv.a. alternator mentioned is driven by a 75,000 h.p. steam turbine, operating 1,000 r.p.m., 170 lbs. pressure per square inch. Generation is at 7,000 volts between phases. The weight of the turbine complete is given as 250 tons; of the turbine rotor, 49 tons; of the dynamo complete, 225 tons; of the dynamo rotor 106 tons. This large steam turbine engine is provided with two condensers of about 32,000 square ft. of cooling surface each. The turbine is fitted with 10 runner wheels—one double plated wheel for the high pressure stage and 9 single plated wheels towards the low pressure end. The design is the standard A.E.G. construction, which means that the entire power is generated in one turbine case and in one alternator.

Low Factor a Common Evil—Some Fundamental Considerations

A consideration of the question of power factor, and its effect upon the operation of electrical apparatus, involves several simple, fundamental laws of electricity, viz.:

(1) The current carrying capacity of an electric conductor, whether it be in the windings of a generator, motor or transformer, or a part of a distributing system, is limited by the heating of the conductor.

This being true, any condition which requires the passage of a greater current for the transmission of a given load, correspondingly reduces the capacity of the apparatus or system of which the conductor forms a part.

(2) The loss of energy in a conductor carrying a current whether it be in the windings of a machine or a part of a distributing system, is equal to the resistance of the conductor multiplied by the square of the current flowing in it.

This being true, any condition which increases the current necessary to carry a given load increases the loss of energy proportional to the square of the increased current.

(3) The drop in voltage in an electric conductor is the product of the resistance of the conductor and the current flowing, so that any condition which increases the current necessary to carry a given load, correspondingly increases the drop in voltage, thereby making the voltage regulation poorer.

There are other considerations which engineers take into account, but in the main we are concerned with anything which lowers the capacity of our machinery, increases our losses or renders our service less satisfactory.

A Subject of Importance

The prime reason why producers and consumers of electrical energy are interested in the subject of power factor, is because the current required to transmit power at a given rate must be increased when the power factor becomes lower, and it is this increased current which causes the losses and reduces the capacity of equipment.

In a direct current circuit the power is equal to the product, "volts × amperes." In all alternating current circuits the voltage changes direction, so to speak, tending to cause current to flow first in one direction and then in the other. Now, if nothing prevents the current keeping step with the voltage as it changes direction, the power is "volts × amperes," the same as it is in a direct current circuit.

Nearly all circuits, however, embody at some point coils or turns surrounding or surrounded by iron, and the frequent charging and discharging of these electro-magnets by the alternating of the current cause the current to get out of step with or to lag behind the voltage, so that to give the same power as when they are in step, an increased current is required, and the more they are out of step, the greater this increase in current.

Some Analogies

Suppose two horses are trying to start a loaded wagon; call one "voltage" and the other "current." If they both go ahead at once, their full power is applied to the load. But suppose one pulls and then begins to let up, and the other starts ahead, out of step, then the full effort of the two is not applied, and each is required to pull harder the further they get out of step.

Here is another illustration which may help to an understanding of how the magnetic fields produced by the windings of motors, transformers and generators cause the current to lag behind the voltage. A magnetic field absorbs energy when the current is increasing and is building up the field, and delivers energy when the current is decreasing and the magnetic field is dying away, just as a spring does when subjected to a varying pressure.

In a plunger pump let the pressure on the steam piston represent the voltage and the flow of water the current; with a rigid connecting rod, the flow of water corresponds to the movement of the steam piston. But suppose we replace the rigid connecting rod with a spring which stands for the magnetic field or the inductance of an electric circuit. Now the flow of water will lag behind the movement of the steam piston, on account of the compression and extension of the spring.

Power Factor Varies With Load

The power factor varies with the load on a transformer, a motor or a system, for the reason that the energy absorbed and given up by the magnetic fields is almost the same at light loads as with full load, and the lagging of the current depends upon the ratio of the energy absorbed and discharged by these fields to the total load. When the total energy is that of the magnetic field, the power factor is zero.

We have seen that in a direct current circuit the power is "volts × amperes," and that in an alternating current circuit where magnetic fields are present, the actual power is less than "volts × amperes," due to the current lagging behind the voltage, and the power factor is the ratio of the actual power to the product "volts × amperes."

$$\text{Power factor} = \frac{\text{Effective power}}{\text{Apparent power}} = \frac{\text{Watts}}{\text{Volts} \times \text{Amperes}}$$

The causes of low power factor are mainly lightly loaded induction motors and transformers, electric arc furnaces or other inductive apparatus.

U. S. Electric Railways Increase Fares

Figures published by the American Electric Railway Association show that 196 of the 273 cities of the United States having a population of more than 25,000 now have fares higher than 5 cents and the tendency is toward still higher fares to enable the companies to operate profitably. The figures show that of the 273 cities, 196 have fares higher than 5 cents, 118 fares higher than 6 cents, 64 fares higher than 7 cents, and 34 higher than 8 cents. The situation at present is as follows:—

Basic fare of 10 cents is charged in 23 cities.
Basic fare of 8 cents is charged in 14 cities.
Basic fare of 7 cents is charged in 58 cities.
Basic fare of 6 cents is charged in 71 cities.
Basic fare of 5 cents is charged in 81 cities.

In 26 cities various rates are charged, zone systems being in effect. Since April, 1919, fare increases have been put into effect in 195 cities, of which 73 had already received increases above the 5-cent basic rate, while 49 had formerly had the 5-cent fare. In the same period fares were decreased in two cities—in Cleveland from a 5-cent fare with a 1 cent transfer charge to 5 cents cash, and Scranton from 8 cents to 7 cents. There are at present applications pending for increases in 45 cities.

The Crouse-Hinds Company of Canada have issued a folder on Waterproof Lamp and Switch Condulets.

Electricity in Canada's Largest Automobile Plant

By Arthur Thormahlen, E. E.

The recently completed plant of General Motors at Oshawa, Ont., is of special interest from an electrical standpoint, because it is not only the largest, but it is also one of the best equipped in Canada, and was planned to be second to none as to labor-saving and efficient production devices. No expense was spared that would add to the excellence of its construction and, in consequence, its electrical equipment may be regarded as representing the highest type of installations of this character.

Layout of the Plant

A detailed description of the plant itself would be out of place here, but I may state that the plant is laid out in two sections, namely: Plant 1, which constitutes the old buildings of mill construction, where all models of Chevrolet and McLaughlin cars are turned out, and Plant II, which constitutes new buildings of reinforced concrete construction with brick curtain walls and steel sash. These buildings comprise the shipping and storage, three storey, 443 x 299 feet, including the train sheds, which have a capacity of 48 cars, and the central enamel plant, three storey 224 x 80 feet, to be used for enamelling sheet metal parts, and the Oldsmobile plant, four storey 80 x 300 feet; also a transformer and a pump house.

The Power Supply

New buildings and demand for increased production made it necessary to install larger sub-stations without holding up production, and as the new sub-station was to be in the same location as the old, it was necessary to erect and equip a temporary outfit, between noon Saturday and 7.00 a.m., Monday, which was done without production being interrupted.

The new sub-station consists of 1800 kv.a., at Plant I, and 900 kv.a. at plant II, with sufficient room to increase the capacity 100 per cent.

The switchboard was furnished by the Canadian General Electric Co., and consists of 18 panels as follows: 1-4000 volt, 300 maximum kv.a., 3 phase incoming line; 1-4000 kv.a., 3 phase feeder circuit for Plant II; 2-4000 volt, 50 kw. synchronous motor panels; 1-4000 volt, 1500 kv.a. power transformer circuit; 1 lighting panel; 2-250 volt, d.c. feeder panels; 2-250 volt, 60 kw., d.c. generator panels; 1,550 volt, 1000 kv.a. heater circuit panel; 4-550 volts, 275 kv.a. power panels. Plant II switchboard is similar to Plant I, with nine panels.

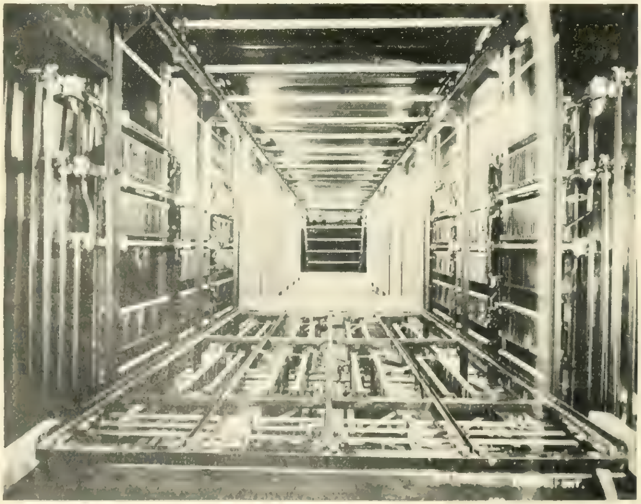
The Direct Current System

Owing to the variation in production it became necessary to equip all our conveyors and ventilating systems with d.c. variable speed motors which are all remote controlled, direct current being obtained from 2-4000 volt, 60 kw. synchronous motor-generator sets, and so arranged that they can be operated in parallel, and as the present load can be handled by one, there is ample capacity for future extensions.

Electric Heating for Enamelling

In former years, bodies, fenders, etc., were hand painted and air dried. Then came the gas oven, which not only was a nuisance but a fire hazard as well. Then the electrically-heated box type oven made its appearance, which, although considered efficient in its day, was expensive from a power consumption standpoint, because after a body or a fender was enamelled it had to be taken into this oven by hand, and then the oven heat had to rise until it was at the proper enamelling temperature and, when baked, men had to wait till the oven cooled again sufficiently before they could remove the finished product. For a production of one hundred and twenty-five cars a day the loss of heat from this source would amount to enough energy to raise the temperature of 10 ovens from 80 degrees to 250 degrees four times each per day.

Then we developed the "tunnel-conveyor" type oven, which is brought to the proper temperature and held



The drying ovens are electrically heated. This oven is equipped with seventy-two 3.5 kw. heaters. On account of the inflammability of the vapor of the enamel, a source of heat with high temperature cannot be used. The heaters are thus maintained below the glowing point.

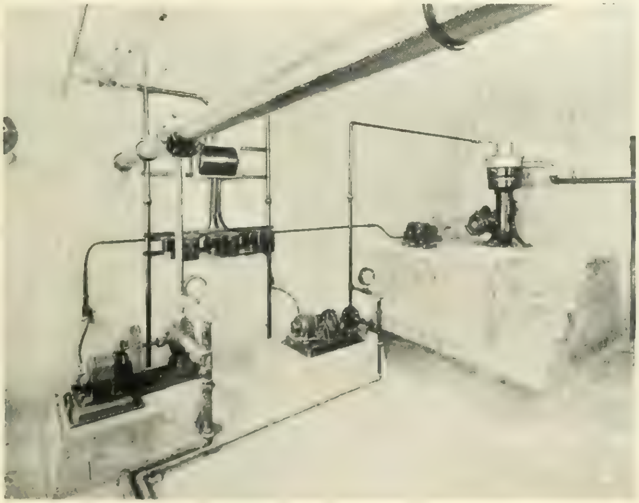
The management of the Oshawa plant of the General Motors Corporation appreciate the value of good lighting.

throughout the day, the body or metal passing through the oven by means of a conveyor, the only additional heat required being that necessary to do useful work in heating the metal to be enamelled.

The oven temperature is maintained at 475°F. the heat being supplied by a number of special C.G.E. electric air heaters—seventy-two, 3.5 kw. elements for each oven. On account of the inflammable nature of the enamel vapor it is necessary to keep these elements below a glowing temperature. The total heating capacity of the three ovens is thus approximately 750 kw. In addition to the use of electricity for heating there are a large number of motor-driven operations, some of which are illustrated herewith. The operating of mill machinery requires about 400 horse-power and the machine shop 75 horse-power.

Heat Control

Owing to the highly inflammable nature of the vapor of the enamel it was necessary to have positive control of heat. Here we employed a Canadian General Electric Co. control panel with 36 separate oven circuits, 18 of which are



View of pump room—A 3 h.p. motor pumping enamel into tanks above shown to the left. In centre, a 2 h.p. motor pumping from tanks to clarifier, shown on right—operated by 3 h.p. motor.

automatically controlled from Leeds and Northrup potentiometers. These instruments have proven to be very satisfactory, and control the temperature within 2 degrees each, and draw a curve indicating the true temperature of the oven within an error of 2.5 degrees. The bulbs, or the thermo-couples, are arranged in 20 foot spacings connected with double throw switches, making it possible to get true readings at various points of the oven.

Owing to a clause in our contract with the Hydro-electric Power Commission it is necessary to have all heating circuits off between 4.30 p.m. and 4.30 a.m., and this is accomplished by an automatic time switch in conjunction with control panel, thus eliminating any error on the part of the operator.

As a safety measure we installed a signal panel in plain view on enamel operators consisting of blue, white and red lamps and 5 in. gong connected to each individual heater circuit. Blue light indicates a low heat, which would leave a tacky, unfinished job. The white light indicates the proper working temperature, and the red light indicates a high heat, destructive to the finish of the enamelled product. In the event of the lamps burning out, which sometimes happens, as a further precaution a 5 in. gong is connected 5 degrees higher than the red light, giving an alarm and notifying the control operator.

The entire system is protected against fire with a Fire-foam Sprinkler System, and live steam-enamel tanks being arranged with automatic quick opening valves emptying all enamel outside of building to underground storage tanks in the event of fire.

Ventilating System

Ventilating an enamel plant requires careful thought and study, in order to eliminate undue heat losses and, at the same time, exhausting the high explosive gases caused by enamel vapors, replacing same with clean air. This was accomplished with Sirocco air purifiers, Sirocco fans for intake and Sirocco fans for exhausing direct, connected to two-1 h.p., 230 volt, variable speed d.c. motors, and controlled from central control room with automatically interlocked control board arranged in such a manner that should, for any reason, some part of the ventilating system fail, the conveyor motor would automatically stop, thereby avoiding any enamel coming into the electric oven until same can be properly ventilated. With this system, the fire hazard and heat losses are cut down to a minimum.

All work was planned by the Chevrolet Efficiency Department of General Motors Corporation, installed by local mechanics, and supervised by the writer and Mr. Edward Maddock, superintendent of electrical construction.

Electric Power—"Farthest North"

Tales of the "Days of '98," the Chilkoot Pass and "The Klondike" are generally associated with a land of ice and snow, Indians and Malmute dogs; but, as Service writes: "There are strange things done in the midnight sun by the men who moil for gold." After the first rush of the Argonauts to these fields, which have yielded up over 300 millions in gold, came the large operators, who, having the courage of their convictions, and undeterred by the six months of ice and snow, weather 70 degrees below, many feet of overlying frozen ground, and 2,000 miles of hazardous transportation, risked over twenty-five million dollars in hydro-electric and steam turbine plants wit hmiles of ditches and powerful hydraulics to scrape the Klondike river from source to mouth for its hidden wealth.

Among the first of these was the Yukon Gold Company, with O. B. Perry of New York, who installed, a few miles above Dawson, a hydro-electric plant, of 1875 kw. operating under a 650 ft. head, and consisting of three 54 inch Pelton water wheels, each direct connected to a 625 kw., 2200 volt, 3 phase, 60 cycle, 450 r.p.m., a. c. generator with 17 kw., 125 volt exciters, and controlled by a six panel switchboard with a voltage regulator.

With 36 miles of main line transmission and 18 miles of branches, this company supplied energy for nine electric dredges each utilizing from 300 to 500 hp., and capable of handling from 5,000 to 7,000 yards of thawed gravel per day during the dredging season which extends from May 15 to November 1 each year. With gravel running from $0.10 to $1.00 per yard and sometimes richer, and only four men required on a shift, the short operating season yields rich returns.

One of the typical excavating machines is a Bucyrus dredge, with 7½ foot buckets, requiring 400 h.p., and having a daily capacity of 5,042 cubic yards. This dredge, as were a number of the others, was equipped with induction motors, ranging in capacity from 100 hp. on the main drive to the smaller sizes on the pump motors.

Following this development came that of the Canadian Klondyke Company with Joseph Boyle at its head. Having located a water power on the north fork of the Klondyke River, about 26 miles above Dawson, and within 175 miles of the Arctic Circle, a 10,000 hp. hydro-electric plant was installed in 1906-08. The electric equipment consisted of two 3000 kv.a,. 2300 volt, 60 cycle, 3 phase, 514 r.p.m., a. c. generators, direct-connected to 5000 h.p., I. P. Morris-Francis reactionary turbine wheels; one 85 kw. exciter direct-connected to a 36 inch water wheel, and one 85 kw. motor generator exciter, together with six panel switchboard and two banks of step-up transformers from 2300 to 33,000 volts, each bank consisting of three 1250 kv.a. o.i.w.c. transformers.

At Bear Creek a step-down station of 3500 kw. was built to supply the various dredges in the district. Later, a 500 kw. steam turbine auxiliary was so connected through step-up transformers of equal capacity, that at least one dredge could be operated by steam power ahead of the others at the beginning and end of the season. This plant being located further north than the Yukon Gold Plant, the company found it necessary to install electric heaters at the intake and at intervals of about two miles in its six-mile power ditch and also in the receiving chamber at the penstock heads to keep the anchor ice thawed out.

The 10,000 hp. plant of the Northwestern Light, Power and Coal Company, was a steam turbine station, located at Coal Creek, about 45 miles down the Yukon from Dawson. The equipment for this station was shipped largely by the British Westinghouse Company, at a great expense from Manchester, England, across Mexico to the Pacific and via the San Francisco water route to Skagway and St. Michael's, and then by the White Pass Railroad, a thousand miles trip down the Yukon and partly over the 600 mile snow trail in winter. The plant was finally installed by a 60 mile, 33.000 volt transmission line with the Dawson Systems. It was intended to supply dredges in addition to the existing equipments, but owing to legal difficulties and the lack of coal at the supposed mine at Coal Creek, after an investment of over $2,500,000, it only operdate 100 days. This is but one of many actual examples of the way the game is played in this country of the Yukon. The plant was not destined to rust and rot, however, for the whole plant, piece by piece to the last rail, was dismantled and shipped to Japan, where it now adds its output of kilowatt hours to the growing paper mill industry of that enterprising country.

Discussion of the Types of Rail Bonds

By Mr. R. W. Palmer*

Rail bonds may be divided into two groups: Those for the head of the rail and those for the web or base of the rail.

U-shaped bonds for attachment to the head of the rail were originally soldered. These were followed by different forms of stud terminal bonds mechanically attached to the rail head, but both forms have given way almost entirely to welded or brazed types of bonds, due to the rapid advances made in the art of welding by oxyacetylene and the electric arc.

The facility with which these bonds can be applied is sometimes misleading, as regards actual economy. In other words, there is a tendency to put too much stress on the first cost of short bonds with the idea that it is cheaper to replace them, due to one cause or another, than it is to adopt a longer and more expensive bond in the first place. Unfortunately, the length of bonds for the head of the rail has become fixed, or almost so, by competition between manufacturers, at 7½ in. and smaller, with a capacity usually of No. 0000, although roadway conditions vary to a considerable degree. Therefore, regardless of the manner in which the bonds are attached at their terminals, the same length of bond will have a long or short life, due to rail joint movement, depending upon the conditions found on any particular property. Yet this very important point of length of bond is often completely ignored by the railway man when it comes to comparing one manufacturer's price with another.

The Concealed Bond

Before discussing the merits of welded types of bonds, it will be well to consider briefly the selection of bonds in the second group, or those for other parts of the rail than the head. In this classification we have the well-known "concealed" type of bonds which is installed under the splice bar. The concealed type of bond is widely used and has about as many advantages as disadvantages. Undoubtedly, the simplest way to apply the concealed bond is by mechanical means, with compressed type or pin type of terminal, in holes drilled in the rail web. Such bonds have been welded only to a very limited extent, and the advisability of welding them to the web is still an open question, for the reason that the spot welding of rail webs in so far as it contributes to rail fractures is a matter which still gives many engineers concern. Moreover, it is difficult to design terminals which are suitable in shape for welding and at the same time will fit beneath the splice bar. The chief consideration, where concealed bonds are used, is the matter of space available. Too often the bond takes up all the space in a new joint, so that when the splice bars wear and are drawn in, the bonds are crushed. The space which dictates the size and forms of bond is that under a worn-out splice bar.

The long bond applied outside of and around the splice bar is easily attached by the various welding methods and is undoubtedly superior to other types where the bonds are not exposed and subject to theft. This form of bond has been used for a number of years both in the solid conductor and the stranded type. With this type of bond, it should be remembered, the cost to the railway is not exactly proportioned to the length of the bond. The principal expense in making this bond is the terminals, so that the cost of a bond installed does not increase in proportion to the length of the bond, and we urge that this point receive careful consideration.

Bonds Must be Installed Properly

Of equal importance to the selection of bonds is the selection and training of men to install them properly. Many bond failures can be traced to improper installation, the work often being intrusted to track laborers or others who have no conception of the importance of the work they have in hand. This point was brought forcibly to the writer's attention while rebonding an interurban property because of excessive drop in the return circuit. In going over the track we found a number of joints which tested open, indicating that the bond was either broken or missing entirely, but when the angle plate was taken off the bond was seemingly in as perfect condition as when installed, a number of years previous. Further examination, however, showed that the terminals as well as the holes in the rail were badly corroded, indicating that the holes had been drilled too large for the size of the terminals used.

To secure the best results with expanded terminal bonds, the terminals should be accurately milled to size and the holes in the rails reamed at the time of installation to give a snug fit. It is also important that the bond terminals should be properly cleaned, after which the contact surfaces should not be touched with the hands. This precaution is necessary to prevent corrosion. Providing the bond terminals are properly expanded after these precautions are taken a very satisfactory contact can be formed and maintained during the life of the bond. The same degree of care should be exercised in connection with the installation of acetylene or arc welded bonds.

Welded Bonds

The welding of bonds with the electric arc and the oxyacetylene flame is such an improvement over other methods that it is receiving the favorable consideration of railway engineers everywhere. Welded bonds are of three kinds, those for gas or flame welding, for metallic arc welding and for carbon arc welding. Only the flame weld and metallic arc weld types will be discussed here.

Flameweld bonds are made with drop forged all copper terminals mechanically attached to copper conductors. The nature of the gas welding process precludes the necessity of having forged copper terminals welded to the conductors at the factory, and this type is very little used now. The steel terminal bonds are considerably cheaper and are equally as good when properly installed, but a little more care is required when they are applied to insure all of the wires being welded together. When flameweld bonds are applied it is not necessary to grind the rail, though the surface of the rail should be coated with flux metal before the bonds are placed in position to weld. This practice insures a thorough union between the rail and the flux metal. At the same time the oxide is removed from the rail surface by the flame.

Pure copper, when used as the attaching metal with the gas flame, does not give good results. Molten copper has a very strong affinity for oxygen, and when used with the gas flame a very porous and brittle metal structure of low mechanical strength and poor conductivity results. The flux wire which we furnish and recommend is a phosphor bronze wire containing a fair percentage of tin. Phosphorus is a deoxidizer and serves as the fluxing agent. The composition is important, as all phosphor bronze wires do not give like results in gas welding

---

*Railway Supply Department, General Electric Company. Abstract of paper presented at quarterly meeting of Central Electric Railway Association, Louisville, Ky., March 10, 1920.

Resistance of Flameweld Bonds

The resistance of flameweld bonds is about 5 per cent. less than that of a perfectly installed double stud or twin terminal bond, and is about equal to that of a brazed bond. Compared with the steel welding, arc-weld bond resistance is about 15 per cent. less. Therefore, electrically, the flameweld bond is as good, if not better, than the best. Mechanically, it is very strong.

The weld is a simple one to make, and the speed of installation compares favorably with all other types of heat applied bonds. One man and a helper, if expert, will easily install eighty bonds in a ten-hour day. The apparatus is readily portable, and in localities where a supply of gas can be maintained readily, these bonds are worthy of thoughtful consideration.

The steel-faced arcweld bond is the latest development and is meeting with much favor. This type of bond has a steel face welded to a drop forged copper terminal at the factory. This is a forward step in the problem of bonding, for the reason that the old difficulty of attaching copper to steel by some satisfactory means is done at the factory, thus leaving a steel to steel weld to be made in the field. This simplifies the matter, for this kind of welding is common.

Importance of Careful Cleaning

To obtain the best results when arcweld bonds are installed, the spot on the rail adjacent to the bond should be carefully cleaned, and all rust, dirt or annealing scale removed. This work can be accomplished with the use of an old file and a steel wire brush. After the rail is prepared the bond should be clamped or held in position and the arc started at the lower edge or bottom angle formed between the terminal and the rail. The operator should carry the arc across the entire length of the terminal if possible without breaking the arc so that the first layer of deposited metal will make a firm union between bond and rail. Before applying the next layer, the operator should use a steel wire brush to remove any surface oxide which may form on top. During the process of welding the operator should hold his electrode at such an angle that for the greater part of his time he will be devoting his efforts toward the rail, inasmuch as the rail being a larger mass of metal than the bond it will require more heat to insure good penetration.

With arcweld bonds, it has been found that the best results can be obtained by using 125 to 130 amp. at a voltage of approximately 20, this being the average voltage required for successful welding with the metallic electrode.

The arcweld bond is now made in two general types: The familiar U-shape for the head of the rail, and a long flexible type for spanning the splice bars. The U-shaped bonds are furnished with round wire strand or with flat wire, and the flexible bonds in two designs of terminal, for attachment either to the rail web or to the rail base.

Equipment for Bond Installation

So far, the question of electrodes for bonding has not received as close attention as its importance deserves. Naturally, the deposited metal should be as homogeneous as possible so as to provide the minimum conductivity for the steel. A very pure wire of high conductivity before welding is not necessarily the best after welding, as the composition undergoes a change in the arc. The desired result differs from that of most steel welds where strength is the prime consideration.

The polarity of the electrode is a much mooted subject. Good welds are obtained both ways and with the alternating current arc. It is safe to say, however, that the positive electrode acts differently from the negative electrode, and the welder has to become accustomed to handling the arc with either polarity before good welds can be made.

Equipments for Installing

This brings us to the point of equipments for installing the bonds. The most popular type at present is the resistance welder, commonly called a resistor. In spite of the fact that the power wastage is large with the resistors, they meet with favor because of their inherent reliability and low cost of maintenance. The first cost is low, and they are readily portable, the wire type for 600 volts weighing as little as 80 lb. Aside from the fact that it is necessary for the electrode to be positive with this type apparatus, the high voltage permits a long arc to be held, and it is generally conceded that a long arc is conducive to poor welds. Consequently, due to what might be termed the elasticity of the arc, there is generally a lack of uniformity with the welds made with these machines.

A low-voltage rotary outfit is conceded to be the best for uniformly good welds, but a motor-generator set has the great advantage of weight, single operator sets weighing close to 1,000 lbs. This is not at all convenient to move from joint to joint. The dynamotor is the lightest type rotary machine for the purpose, and offers the most attractive proposition both from first cost and weight standpoints.

Features of Arcweld Bonds

In conclusion, I will point out the chief features of arcweld bonds: The steel welding face is in plate form, and the copper in the terminal is directly welded to it. In the manufacture, no intermediate metal is used to join the steel and copper together, both metals being directly joined while their surfaces are in a state of fusion. No matter how hot an arc is used on the steel face, the copper will not separate from it. This is very important because it is necessary to raise the bond terminal to a high temperature to ensure a weld between the electrode and the steel face.

You may wonder why we go to the expense of applying the steel welding face, instead of using a plain copper terminal. If the problem was simply one of welding two pieces of copper together, we could do that, but when we try to weld steel and copper together, using either a steel or copper electrode, it is not successful because of the different thermal conductivities of the two metals. Unless the copper bond is pre-heated (and this is not feasible), it is doubtful if any electrode will be developed which will do this.

The cost of installing any particular type of bonds, having terminals welded to the rails, will vary with the cost of labor, current and conditions under which the work is done. Therefore, it is impossible to give any figures which might apply generally.

Time Required to Instal Bonds

The only data which we have as to the number of bonds which can be installed in a given time are for some No. 00-26-in. arcweld bonds, applied to the base of 40-lb. rails in coal mines. Here the current for bonding was supplied from a motor-generator set mounted on a small car coupled to a mining locomotive, and a crew of three men was used. One prepared the rail and the other two took turns at welding and operating the locomotive, the other acting as helper. With this outfit an average of twelve bonds per hour were installed, and the man in charge of the work established a record of applying twenty-four bonds in fifty-five minutes. Taking into consideration the time required in moving the equipment from place to place and the difficulties encountered in doing this class of work in the mines, it is believed that the results obtained were very satisfactory.

Interim Report of Wiring Committee

The statistical records of the Underwriters, which are now becoming available, indicate that a large proportion of so-called electric fires are due to the leaving of flat-irons, etc., in circuit and in contact with inflammable material.

The question of these fires has been under consideration for some years by the Wiring Committee of the N. E. L. A. coming under its province for the reason that many of the suggestions for the prevention of these fires were suggestions for rules as to the wiring leading to the flat-iron or to the device, or in some cases suggestions as to the wiring leading to the receptacle or socket to which the flat-iron might be attached. After consideration of this subject for several years, the Committee now takes a position as follows:

In considering the possible method of reducing the fire loss we may at once reject the idea that irons should be so constructed that they may be safely left in circuit in contact with inflammable material. It is possible that temperatures might be controlled so that an iron could be safely left in contact with some kinds of inflammable material for several hours; but no iron could be made so that it could safely be left for an indefinite period of days or months. While there is no danger in itself in construction which limits the temperature and while in fact such construction may be advantageous rather than otherwise, yet to depend for safety on a construction of irons which encouraged the careless leaving of irons in circuit would obviously be a misfortune.

A second means of reducing fires is to have some scheme to call the attention of the user if he or she leaves the iron in circuit. Among these suggestions are the use of a pilot light at the receptacle or socket to which the iron is attached; the use of lights on the iron, etc.

Forced Use of Pilots is Objectionable

Again it is clear that these are of doubtful utility. There is no great danger when there is anyone in the room, since the smoke or flame calls attention in time to prevent any large loss, while the pilot lights are of no use in the really dangerous cases when no one is present. To require a pilot light at the receptacle is particularly evil, since the effect of requiring such a light is merely to encourage the omission of receptacles entirely, the iron being used off the lamp sockets.

Of course there is no objection to the pilot light in itself; the evil is in the rule that attempts to require the pilot light in all cases, with the practical result of a worse condition than if the pilot light is merely approved and encouraged but not required.

Another way to prevent fires is to construct the iron so that the circuit is open except when the iron is placed safely on its stand, or when the iron is held by the handle. Such irons have been constructed, but are not acceptable to the public, some people refusing to buy them, while others tie the switch on the iron so that the circuit does not open when the iron is left unattended.

Still another method might be some sort of time-clock and switch on tthe iron, so that the circuit opened every fifteen minutes or some period short enough to avoid danger. This, however, would seem to be impracticable and in any case uncommercial.

In our opinion, the proper solution of the question is to recognize the iron as a tool that will do harm if improperly used. To construct an iron so that it will not heat and set fire to cloth if left in contact, would be like constructing a knife that wouldn't cut, or a match that would not light.

We have stated in our previous reports that the chief method of preventing these fires was in the education of the public. The question of just how to educate the public is a difficult one. It has been suggested that there should be a penalty for carelessness, one way being to impose some legal penalty, even if a slight one, on carelessness. Another way to make a penalty would be for the insurance companies to put in their policies that they would not pay small losses, just as the insurance policies against theft and burglary apply only to the large losses and not to the minor losses. Such questions, however, are outside of the province of the Wiring Committee.

Do Not Make Rules that Can't be Enforced

Finally, the Committee is of the opinion that the central-station people can and should educate the public to the fact that the iron is a very efficient and valuable tool, which, like most tools, is perfectly safe if properly used, but which is, like everything else, dangerous if carelessly used. The Committee is also of the opinion that so long as the iron is of the good quality now available, and so long as the cord is of good quality and readily detachable, so that it is easy for the user to disconnect the iron from the circuit, any further restrictions in regard to the wiring are of no advantage in respect to this source of fires, while some of the restrictions suggested would be, and are in practice, dangerous since they are not and cannot be universally enforced, and, therefore, merely encourage the use of the iron off the ordinary lamp socket, a procedure which, while not especially dangerous, is by no means as good as its use off the ordinary wall or baseboard receptacle.

While the Wiring Committee has come to the above conclusion unanimously after several years' discussion, it by no means desires ever to take the position that any matter is finally settled, and, therefore, invites discussion in order that all points of view and possibilities of improvements may be clearly brought out and laid before the membership.

Important Privy Council Case

An important judgment of the Privy Council is published by the Quebec Chronicle, in which the appeal of the Quebec Railway, Light, Heat and Power Company, Limited, appellants, vs G. A. Vandry and others, respondents, from the Supreme Court of Canada, is dismissed with costs.

The decision, which was delivered on February 17, 1920, was a judgment of the Lords of the Judicial Committee and concerns a fire which some years ago destroyed the summer home of Mr. Victor Chateauvert, a large barn and stable and the building owned by Mr. G. A. Vandry, known as the Quebec Hunt Club, all situated on the St. Foy Road. The fire was caused by a branch of a poplar tree which coated with ice and broken by the wind was driven against overhead cables, carrying them down and causing the high tension current to find its way along the secondary cable into the houses supplied by the Quebec Railway Company.

Messrs. Vandry et al, instituted proceedings in the Superior Court and received judgment in their favor, the company appealed and in the Court of King's Bench the judgment was reversed, but the Supreme Court, by a majority of one, restored the judgment of Judge Dorion in favor of the plaintiffs and this has been further sustained by the Privy Council dismissing the appeal of the Quebec Railway Company, with costs.

Modern Practice in Switchboard Design

By Mr D H Colcord

Two most desirable features in industrial practice in switchboard design are flexibility and safety. The unusual exigencies of production during the period of the war required constant readjustment of machinery and plant managers are still compelled to continually shift machinery and apparatus to meet new conditions created by this period of industrial expansion. Labor shortage requires the employment of operators inexperienced in handling power circuits and, consequently, control apparatus must be so built and installed to insure simplicity of operation and a large degree of protection. To procure the necessary flexibility and, at the same time to avoid the expense of intalling the more expensive type of slate or marble boards, dead front switch boards of unit construction built of pipe, angle iron, pipe clamps, conduits, steel plates and externanlly operated, enclosed safety switches are becoming popular.

Switchboards of this type protect the operators as no current carrying parts are exposed on the face and are generally constructed that all bus-bars and all conductors on the back of board are enclosed. Furthemore, any motor may be locked out of production at the switch, thus preventing any one making the contact and starting the motor inadventently while an employee is making repairs.

Dead front switchboards of unit construction are adaptable to small power plants for the control of motor-driven auxiliaries, fans, blowers, coal and ash handling machinery, feeders and distribution circuits. Their advantage for general industrial purposes are: They start motors from one central point, thus eliminating individual switches, they avoid the use of fuses throughout the system, individual motors can be tested and proper readings made without interfering with wiring or shutting down, full protection for motors, operator at any machine can shut down motor by touching a button, only authorized persons can start motors, and they reduce cost of large motor installations and maintenance.

From the standpoint of cost the use of this type of board is important. They can be erected quickly by any capable contractor from material that is always available. Flexibility is provided in adding units with the necessary growth of a plant. To be specific: When a group of motors are installed additional space may be added to board and a control unit built in to operate them. Again conditions may require that a switch directly connected to a motor may be moved to the switchboard or a swtch moved to the motor as the occasion may require.

An example of a successful dead front switchboard is one installed in the California Sugar Refinery Company's plant at Crockett, California. In the first place this switchboard meets the requirements of the Pacific Board of Underwriters and the Industrial Safety Commission. The shifting of the various loads incidental to sugar refining make a flexible board of this kind essential. The plant contains 400 motors, ranging from 1 to 200 h.p., a total of 6,000 h.p. These motors operate conveyors, pumps, reels, screens, centrifugals, machine tools. The daily load is very uniform as a definite tonnage of sugar is produced each hour of the twenty-four. Power is provided by non-condensing turbo-generators, operating a 480 volts, three phase, sixty cycle circuit. The exhaust steam is used in the sugar refining process.

The main switchboard consists of three electrically-operated generator oil switches of 3000 amp. In addition, there are fourteen remote control manually operated oil switches, rated at 500 amp., having seven feeders on each end of the bus with generator connections in the centre.

Space in this plant is a considerable factor and all wiring is carried in conduits. Leading from the main switch are three 500,000 cr. mil. cables with 3 in. conduits as envelopes, all carrying the same value of average load. The main conduits begin in the power house with porcelain-lined bushings near the feeder terminals of the 500 amp. oil switches. They are gauged beneath the floor line following to the first point of divergence. At this point a sheet steel junction box, approximately 24 in. x 24 in. is installed where feeders are separated into sub-groups leading to various sections of the refineries. It forms a continuous metallic bond from the feeders to the machines. The power station ends are grounded by large copper plates buried in moist earth below the buildings, with auxiliary grounds to permanent water pipe system.

The load is divided and the control grouped according to the size of motors. In one group—controlled by switches grouped in a signal cabinet—all motors from 75 to 150 h.p. are operated. In a second group the main feeders are run to sheet steel distribution switchboards which control all smaller motors.

All sub-distribution switchboards are planned to economize on the length of feeders, placing the boards as near the load as possible. Unit switchboards built of iron frame are readily convertible. easily moved and flexible. These units are built of No. 12 gage sheet steel 18 in. x 84 in., mounted on 2 in. x 2 in. angle iron supports. Each panel carries three 100 amp. three pole, 500-volt, alternating current, externally operated switch units. Near the top and at the rear is a sheet steel bus compartment 10 ft. x 15 in., made of code thickness metal. The panels are grouped to form switchboards. Each compartment is designed with a view to single panel extensions so that panels can be added from time to time. The bus material is supported on cleat insulators. All taps from switch units to bus bar and from switch units to sub-feeders are in conduit and enter switch from the rear, and are held to switch by means of lock units and bushings.

Example of dead-front Switchboard

The principle which was kept in mind in running as many feeders as are used was that in order to meet the many changes both in motor h.p. and in the re-arrangement of machinery, it would be necessary to gridiron the whole area with sources of power.

Another switchboard that illustrates the value of a unit type of deadfront switchboard is the one recently installed by the Pridham Division of the Paraffine Company's plant at Oakland, California. The board was designed for a surface type installation as floor space did not warrant setting the board out from the wall in such a manner as to allow back connections. Furthermore, the framework of this building is all wood and this fact, together with the great demand at the time of installation for metal products, did not seem to justify metal framework.

This board is 7 inches high by 10 inches in width. The bottom of the board is 18 inches from the floor and there is an 18-inch platform in front of the board, which not only brings the top within reach, but the platform acts as a protection from heavy material trucks which are commonly used in the factory. The frame is built of 2 in. x 12 in. selected pine, surfaced and sanded, and put together with doweling pins and glue. The doweling pins are extra long, running into the edge of the board, top and bottom, approximately 4 in., which is an additional protection against shrinkage and warping. The rear of the board was painted with two coats of lead white, the front with one coat of lead and two coats of white enamel—auto gray.

A gutter consisting of four cross sections and the connecting sections is made of No. 16 gauge galvanized iron, black enameled, 4 in. in depth and 5 in. in width. The covers of these gutters are set on in sections and are fastened in place by machine screws. The three upper gutters carry the main busses, all of the same sized wire, there being no reduction in the size of wire from the main switch to the extreme end of the bus. In every case the switch is fed from the top through a nipple of conduit, then out from the end of the switch through a nipple of conduit through the gutter below, directly to the left to the first conduit riser and up to the top gutter. The upper cross conduits are 1½ in. in size, allowing plenty of room for two or more circuits, which permits of the sub-feed from the lower gutters, passing directly up to the upper gutter, where all connections for sub-circuits are made.

The feed for the extra switches is connected and terminates at a point in the upper gutter. Directly below the main switch is a metal cabinet containing meter and current coils.

The salient feature of a switchboard of the type described above is its low cost and flexibility, at the same time providing a highly desirable safety factor and an efficient control mechanism. One mechanic and helper mounted the entire board in eleven days, the material used as follows: Paints, oils and brushes; thirty-seven feet gutter pipe; lumber; sixteen feet of 1½ in. conduit; thirty-two 1 in. x 4 in. conduit nipples; sixteen feet of 1 in. conduit; sixteen 1½ in. monitor bushings thirty-two 1 in. locknuts; seventy-two 1 in. monitor bushings; one hundred forty-four 1 in. lockouts; main bus cables of 100 ft. of 400,000 circular mils.

The entire output of the Central Foundry Company, Limited, Georgetown, Ontario, who are manufacturing conduit fittings and crowfeet, is controlled by the Victoria Electric and Supply Company, Limited, Toronto. A pamphlet, showing the different lines manufactured and prices, has recently been issued by this company.

The St. Agathe de Lotbiniere Telephone Company, P. Q., have been granted letters patent by the Lieutenant-Governor-in-Council to operate a telephone service between St. Agathe, Lotbiniere County, Leeds, Nelson and Bosquet, Que.

Mr. K. J. Dunstan, Ontario Division manager of the Bell Telephone Company, is quoted as saying that the next exchange established in the city of Toronto will be automatic.

THE LEGEND OF JIM BLANK

Big Jim Blank sat in his office chair,
Manager, clerks, and all were there.
Blank ran his business for gain and not fun;
Work-saving aids, a thousand and one,
Were used—for of obsolete methods were none.
And that was Jim Blank—he'd rave and he'd cuss
Unless he could have efficiency plus;
Time-saving methods—devices electric—
Jim Blank would have or he'd turn apoplectic.
He ran his whole office on just such a plan,
Because—well, because he was that sort of a man!

At home, though, Jim Blank
Was a crusty old crank.
And on old-fashioned methods of working he'd bank.
His wife—sad her plight—
From morning 'till night
She'd work and she'd worry, which wasn't quite right.
"I want," she would say,
To Blank, ev'ry day,
"Some electrical things—
Then the work would take wings;
My maid is so peevish I fear we can't keep her.
Why don't you bring home an electrical sweeper?
If you run your office helped out by the ohm,
Why not give to your wife the same help in the home?"

But Jim couldn't see it. He went off to bed
And he dreamed such a dream that he wished he were dead.
He dreamed the whole household had sauntered away,
And left him alone for a week and a day.
There was washing and ironing and sweeping galore;
Sewing to do—and meals by the score;
Up and down stairs ev'ry second he tore,
Answering the phone and op'ning the door;
And, had he the time, he'd have sat down and swore!
He thought of the office, but in between wishes
He had to bend over and wash up the dishes!
Between you and me I think you'll agree
Jim Blank had a dream that was no jubilee!

Next day, at about, say a quarter of four
(Though, maybe three-thirty—or a trifle before),
There drove up a wagon,
Its very sides saggin'
As if the old thing had a wonderful jag on,
And left at Jim's door a gift to his wife.
Such helpmates she never had known in her life—
Electrical helpers, and irons, and such,
Cleaners and washers that would start at a touch,
And keep human beings from working too much!

There's a moral that's hidden somewhere in this jingle,
That applies to the married man more than the single;
The chap at his office who daily will fuss,
Unless he is getting efficiency plus,
Often forgets that his home's in a muss!

Give electrical help—then the wife will be cheerier,
And even Blue Monday won't give her hysteria!

The Contractor-Dealer

Co-operate and Make Business Better—Sell the Idea—He Who Helps Others Helps Himself Most of All—Vancouver Contractors Are "Doing It"

There is a means at the command of every electrical dealer to wake up his community to keener appreciation of the uses of electricity—

To focus attention more sharply on the merits of the washing machine, vacuum cleaner, sew motor and other helps that have never existed as far as some women are concerned—

To bring to the home builder and home owner a knowledge of the advantages of having plenty of outlets for whatever lamps and appliances may be desired.

The manner of doing all these things is neither expensive nor laborious nor complicated. On the contrary it is remarkably simple, easy and low in cost. It can be applied in big city or small town—wherever there are electrical dealers who want more business.

This potential wonder worker of the electrical industry is simply Co-operative Advertising.

Sell The Idea First

There should be a clear-cut distinction between advertising to sell goods and advertising to sell an idea. Co-operative advertising by electrical dealers should fall into the latter class because its object should be to educate readers to the many uses of electricity, to strengthen their belief in the necessity of electrical appliances, to direct their attention to electricity as a solution of the servant problem. Advertising, well planned, forcefully written and consistently put before the public to sell this idea can have only one result, to increase the sales of every sort of electrical ware for every dealer in the territory covered.

Co-operative advertising of this character is well worth while and is certain to raise the level of sales and make far more effective the individual direct sales advertising of every merchant who takes part.

This Is How It Works

To get a concrete idea of the working of such a plan take the case of a dealer's co-operative advertising association in a large city where natural gas is being used for cooking and heating, but where sudden winter demand has so drawn on the supply that it is impossible in many sections to get enough gas for the cooking of meals. A meeting of the advertising committee of the association is called, the committee representing the various important factors in the association.

At this meeting it is decided to run in the local paper a series of three advertisements—one full-page appearing each week—calling attention to the advantages of the electric range, not only as a means of overcoming the present difficulty but of permanently solving the cooking problem.

It is further determined to trim all windows with a standard range display, and to use range cards in local street car advertising display.

Thus at one meeting, and with a minimum of effort, decision is made as to the message and the means of carrying it to the public. Results are secured much more quickly and at a much lower cost than would have been possible with each dealer working independently.

This merely illustrates what a co-operative plan of advertising might do in an emergency. Its value as an every day business booster is even greater.

What Co-operation Brings

Of course co-operation in advertising is not by any means a cure-all, but it is practically certain to prove effective wherever it is properly applied.

There is no question of the greater effect of large advertising space as compared with an equal amount broken up into smaller units. There is no question of the value of well planned, effective window displays. Both of these are insured by a sound, well managed co-operative plan.

In addition there is the stimulus of working together, of all pushing washing machines one week, irons another, vacuum cleaners another and so on. It is the old story of the woodchopper with his bundle of sticks.

How to Organize

Perhaps you say "That's fine if somebody else would only start it."

Doubtless that's exactly what everybody else in the trade in your city is thinking. The logical thing to do therefore is to assume that nobody will start it if you don't and then peel off your coat and get busy.

First make it a point to call on every electrical dealer with your plan. Explain that you aren't asking him to quit his individual advertising, but merely to divert some of his appropriation or add to it.

Make it clear that there will be no burden on him for preparing the advertising, that the expense will be proportionately small, and that the result will be felt in his business just as surely as in any other.

If your business is in a big city it is likely that a number will hold out—they will have one excuse or another for not wanting to co-operate. The big part of the job is to get as many as you can, get them together at a meeting and decide just what your basis of operation shall be.

How the Money Should be Spent

After the funds have been secured be sure that they are well spent. If you are located in a city, select a man with ability and experience to prepare all the advertising matter. If it happens that you live in a small town get a newspaper man to help you out. Put him on the advertising committee, not in charge of expenditure of funds but as an expert in the preparation of "copy."

In any case it is a good plan to have a committee, not only to approve specific pieces of advertising copy, but to direct the purchase of space and what shall be advertised, when it shall be pushed and how it shall be featured.

Advertising Media

No matter what the size of the city may be there are always available such media as newspapers, window display and lantern slides. In the larger cities the street-car card is an added element.

All of these should, of course, be handled in conjunction. When washing machines are advertised in the co-operative newspaper space there should also be a co-operative window display on washing machines. This matter of window trims, like the newspaper copy, should be handled by the best window trimmer available. In this way the main thought can be kept in each trim but each can be made slightly different, the variations being such that the total effect will be greatly increased.

Remember that it is with a business as with a man: He who helps others helps himself most of all. Get behind and boost!

Here is Co-operation

As we noted in our last issue, the Vancouver papers are running electrical pages regularly now and the Vancouver contractors are co-operating. Herewith is an advertisement that appeared in a recent issue. Some of these contractor-dealers are perhaps doing business in too small a way to take a big space regularly, but it is a much simpler matter to be one of a group. And this kind of an advertisement is likely to be very effective, too. There is such a big choice that the average customer would likely be satisfied to pick one of them, feeling at the same time that the advertisement acted as a sort of guarantee of good work and service. It is, we think, a good example for other towns and cities to follow.

If you want something in an Electrical Appliance, repairing done, remodelling of your fixtures, new fixtures, wiring, motors repaired or rewound, get in touch with

ANY ADVERTISER

or One of the Names Mentioned Below

ELECTRICAL CONTRACTORS WHO SPECIALIZE IN BETTER WIRING

C. C. Carter,
739 Hastings West.

Cope & Son,
150 Hastings West

Clayton Electric Co.,
2148 Main Street.

Electric Shop,
12 Hastings East.

Electric Repairing and Engineering Co.,
546 Howe Street.

Electric Supply and Contracting Co., Ltd.,
781 Granville Street.

W. W. Fraser,
602 Hastings West.

Graham Electric Co.,
929 Pender Street.

Hume & Rumble,
New Westminster.

Jarvis Electric Co.,
570 Richards Street

Jenkins Electric Co.,
593 Main Street.

Lang Electric Co.,
Industrial Island.

P. F. Letts,
3044 Granville Street.

C. Moulton,
New Westminster.

Muir Electric Co.,
412 Hastings West.

Mundy, Rowland & Co.,
510 Hastings West

Montgomery Company,
325 Hastings West (Rear

Orr Bros.,
1210 Granville Street.

Rankin & Cherrill,
55 Hastings West.

J. C. Reston,
602 Hastings West.

Richardson Electric Co.,
923 Georgia West

Shand Electric,
2007 Granville Street.

T. C. Simmons,
5368 Main St., S. Vancouver.

H. B. Steeves,
2245 Eighth Avenue West

C H. E. Williams,
509 Richards Street

DO IT ELECTRICALLY

The British Columbia and Alberta Power Co. is taking immediate steps to get their big power proposition on the Bull River under way. They expect to be selling power by next October. The president is Mr. A. E. Appleyard.

A Hint to the Contractor-Dealer About to Open a Store

The only way to success that I know of is "Hard work—damned hard work," said one contractor dealer, and to some extent he is right. But hard work alone will not gain success. The electrical dealer must add: good window and store display, judgment in buying as well as in selling, tactfulness when dealing with customers, wise advertising, always on the lookout for opportunities. These are some of the aids to success.

There is one aid to success, for the storekeeper, however, which is only too often overlooked; that is, the right location for a store. Because a district may be good for a butcher's shop, or a store selling drygoods, does not suggest that it would be a good location for an electrical store. Almost everything sold by the butcher and the drygoods dealer is necessary, or considered so, and is bought by all classes; but the sale of electrical goods is in its infancy, and the people, for the most part, have yet to be educated as to their need for such goods. Consequently an electrical dealer should choose a prominent location where people are constantly passing. If it is on a street through which the cars pass, choose a store as near to a stop as possible, so that when the passengers alight the first thing they will see is an electrical store. Intersection street corner stores are especially good, because of the constant stream of people who pass by every day.

Again, choose a district not already crowded with other electrical stores. If you are attracted to a district which already has one or more electrical stores, make sure that there is a large enough population for you as well as them. A druggist says that it needs a population of three thousand to keep a drug store running without sidelines. That would probably also apply to the electric store. The contractor-dealer should figure out the number of people necessary to make it worth his while opening a store.

Locate in a growing district and grow with it. Such a location will give you more contracting as well as store business. Remember that you depend upon the public for business and, therefore, it is necessary to study the ways of the public.

Cultivate Courtesy Towards Customers

Courtesy goes a long way towards making a sale, and also increases the probability of a repeat order.

The writer was in a very attractive electrical store a few days ago, when a young fellow came into the store to purchase a lens for his "torch." The dealer did not stock them, but told the customer where they could be procured, and hunted up the address of the firm, in the directory. It was only a little thing to do, but such little courtesies revealed the fact that he was interested to help, in any way, those who entered his store.

If a dealer employs salesmen, he should make certain that they also are following out the rule of courtesy to all customers—whether of the aggravating kind or not—for there is very little use in the dealer himself being courteous, if his salesman take the opposite course.

Shoppers get very tired walking around and visiting store after store. It may be that the storekeeper also is tired, but if the shopper goes into that store, and finds a salesman with a smiling face and a willing-to-please manner, she will lose much of her irritation, and be much easier to please, and sell to. Many shoppers will so arrange their shopping that, when tired and irritated, they make their final purchase at the store of the dealer who always greets them with a smile. This kind of treatment sends them home less disgruntled with shopping and with greater praise for the dealer.

Co-operating with Contractor and Architect

To Ensure That All New Houses be Equipped with a Proper Supply of Baseboard Receptacles—In No Other Way Can the Householder Enjoy the Complete Advantages of His Appliances*

As it is well known to all members of the electrical industry, there exists today a very active and growing demand for electrical devices and appliances of varied domestic types and usefulness. This demand is most acute in the case of the labor saving group. Of course, this is building upon a very solid foundation. What is there in the wide world more desired by the average human being than to escape the hardships of physical labor. The well to do and wealthy have long been accustomed to accomplish this by the hiring of servants, but in the present domestic problem, such help is scarce indeed, so the obvious alternative is to utilize what labor saving devices may be obtainable, and here we have the first explanation of the phenominal impetus given of late to the demand for washing machines, ironing machines, dish washers and vacuum cleaners. The increasing publicity has brought these labor savers to the attention of the humbler families, and now many a good housewife, who never aspired to the luxury of a servant, saves both her back and her strength by utilizing electricity's latest reliefs to household drudgery. So no longer can we associate electricity in the home merely with lights, or with the now altogether common articles of convenience, as flat-irons, toasters, percolators, heaters, etc., for the field has broadened again and dire necessity, not mere convenience, is now served by these modern inventions, which, indeed, constitute a boon to the human race.

Occupying such a place in the daily routine of life, it then behooves each of us in our own industry and associated vocations and professions as well, to bring these labor savers and comforts of electricity within reach of the greatest possible number of users. The field has only been scratched (the saturation today is estimated at about 10 per cent.) and the demand, heavy as it is now in relation to production, we all must realize is meagre compared with what it will be in the future if intelligent and effective effort is put forth to clear the track of known obstacles.

Obstacles to Progress

Let us then consider the obstructions. Ask any electrical dealer what limits most his sales of appliances and you will almost always get the same answer, i.e., the premises are not wired to accommodate the articles and, moreover, in the case of washing machines, ironing machines, dish washers, and ranges, no space has been provided in laundry or kitchen in which to locate them. The buyer then faces the expense of alterations and additional wiring which, to the average housewife, seems extravagant and perhaps prohibitive, and which, we must admit, is all out of proportion to what the cost would have been had these simple requirements been provided when the house was built.

The author of this paper has a neighbor who has just installed, in his living room, two flush wall receptacles to accommodate respectively a piano lamp and a portable lamp, and the cost of the two outlets was $24.70. Most of us can cite cases of this kind, involving much greater and more disproportionate expense, which have come under our observation. Although the prospective buyer may have been sold on the electrical idea and really wants the device, being willing to pay its purchase price, there is a psychological reaction and revulsion of feeling on the point of paying, in addition, the cost of remedying the result of someone's neglect or oversight that now blocks the way. With a feeling akin to resentment, the prospect may throw up her hands and decide to do without, consoling herself with the thought that she cannot afford such an outlay.

You can imagine how this situation is intensified if the prospect is not the owner but merely a tenant of the house and must, therefore, pay for wiring and outlets to be permanently installed in her landlord's premises. There is a point where human nature revolts at imposition. Why, then, we are now entitled to inquire, is not the home, whether house, flat or apartment, properly wired in the first place to avoid such complications? We are coming to that.

Practically all living abodes (houses, flats and apartments) are designed not by the ultimate owner or tenant but by an architect or building contractor, hence these vocations become a link in the chain of our troubles. No sooner do we start out to investigate why the architect and builder slight the electrical requirements of a home than we uncover some bonafide alibis to any charge of neglect brought against them.

Misusing the Lamp Socket

The first invasion of the home by electricity, and this was the only domestic development for many years, was in the field of illumination and to this day electric light means a lamp and a socket just as it did in the beginning. Later came switches as a more convenient means of current control and the architect and builder adopted them. The switch, however, did not replace but only supplemented the socket and here you have in combination the two articles associated together in the public mind as the whole answer to the employment of electricity—the socket for connection and the switch for control. But in recent years came the introduction of the electric flat-iron, which was but a forerunner of a great variety of heating and cooking devices, and, notwithstanding the increased wattage involved, the manufacturers designed and exploited these articles as "lamp socket devices," and they were so termed by the jobber, dealer and lighting companies in passing them along to the ultimate consumer. So, again, the public had confirmation of its original conviction with the natural result that weighty articles like flat-irons, toasters and percolators dangled from cords which tugged and pulled at their moorings, i.e.—the

"We little fellows are often blamed for the cut-price conditions in the electric contracting field," said one of them the other day. "As a matter of fact I never take a job unless I can see 50 per cent. over time and material cost. I find I cannot do business on less than that and I find also that the public is willing to pay a fair price for a good job."

---

*Paper to be read [illegible] Toronto [illegible] N.E.L.A. [illegible] helpless socket pinioned to the chandelier or wall bracket.

Who then is responsible for the popular dependence upon the socket for double duty—first to accommodate the lamp and, then by removing the latter, to accommodate a utilization device? Who then is to blame if the housewife, with supreme trust in her faithful and versatile socket, expects it to also serve for motor driven appliances such as vacuum cleaners, washing machines, ironing machines, etc.? Is it not customary for an industry to do its own pioneering along educational lines? Why then blame the architect and builder, who are primarily engaged in the designing and construction of homes, if they do not take the initiative in rectifying a blunder of the electrical industry. The most we can reasonably ask or expect is that, at this late date, they join hands with electrical manufacturers, the underwriters, the inspectors and electrical contractors in a conscientious endeavor to wise up the public that sockets, connected as they generally are to light fixture cord or wire, are best suited for lamps only and certainly must be limited to low wattage devices, while modern flush receptacles of the enclosed contact type, fed by No. 14 code wire or larger, are necessary and safer for the heavier current consuming articles and appliances. The flush wall receptacle then is the answer—for at one and the same time it kills off the nuisance of removing lamps from sockets, the unsightliness of the suspended cord nad the danger from overload.

After absorbing this bit of education the public will be better prepared to understand the necessity for special wiring and connections to feed and control the operation of an electric range and, with a general appreciation of all these points, it is inevitable that living quarters will be electrically wired in the proper style when the premises are under construction.

Show the Contractor and Architect

Surely we cannot assume that the architect or builder will oppose this program if properly placed before them. Never. The architect, artist though he is, will not scorn to give heed to the essential necessities and practical conveniences to which his clients are entitled. The builder, who constructs houses on a commercial scale, has the additional incentive of self-interest which, aside from consideration for his client, will ultimately dictate his attitude. He will quickly learn that houses with incomplete electrical installations or unattractive fixtures will neither sell or lease so easily as houses that are properly equipped. He already appreciates what a garage adds to the desirability of a house.

The world was a long, long while in bridging the span from the flickering wax candle to the carbon filament, but once there, and with electricity in the saddle, we have rapidly progressed. Now the people want and demand in their homes not only perfect illumination, artistically provided, but all other available comforts and particularly labor savers in the daily routine of domestic grind, namely—heating, ventilating, cooking, dish-washing, house-cleaning, laundering, etc. We are not picturing a dream of the future but a reality of to-day. Let any skeptic investigate the facts and learn to his amazement of the mounting millions of dollars invested annually in these goods by householders.

The Objects Sought

If the foregoing may be taken as establishing our premises, that is to say, a need for co-operation between the electrical industry and the allied professions of architect and builder, then let us endeavor to summarize our case and specifically set down the things we want of the architect and builder to accomplish which we are tendering our offer of co-operation. The objects sought are:

First. A complete wiring installation in each new house (and this would include all living abodes) providing, first, for illumination on a liberal and decorative scale, and, second, for the utilization of electrical devices and appliances—the householder being the beneficiary of this foresight at normal cost.

Second. The specification and actual use in these wiring installations of materials of known quality thus insuring to the consumer maximum reliability of service and reflecting credit upon the electrical industry.

The subject allotted for this paper, you will note, takes an interrogative form "How should the electrical industry co-operate?" We have now reached that stage of our discussion where, with our objectives defined, we may proceed to a consideration of the best and most practicable means of attaining same.

Working Together

Let us first and forthwith dismiss the old idea of each manufacturer going at it single-handed. For years the architect and builder have been besieged by individual manufacturers in the interest of their respective products but such solicitation could hardly be regarded as co-operation, rather the reflected activities of self-interest demonstrated in the usual commercial style. There is no doubt at all but that this competitive scramble for the good will of the architect and builder has done a lot to acquaint these professions with the individual brands of wiring materials. It is equally certain that this incessant solicitation is largely responsible for the reputation which these professions bear as to being hard to approach or get at.

It is to be hoped that we shall be immediately able to convince Mr. Architect and Mr. Builder that the idea of co-operation now in our mind is something entirely different, founded on the constructive and enduring principle of better service to the public comprising the people who are first the clients of the architect or builder and immediately thereafter the patrons of our industry. Moreover, the present appeal is shorn of individual selfishness in that it comes not from the manufacturer alone but from a united industry embracing manufacturer, jobber, contractor-dealer and central stations.

Attacking the Problem

First. We must let the architect and builder know what we want and the suggestion is made that the electrical industry state its case briefly and offer its co-operation through the medium of advertisements placed in the respective magazines or publications of these professions. This would be the opening gun and should not be fired until the rest of the plan is ready to be put into operation.

Second. It is suggested that different sets of typical wiring plans be prepared, suitable respectively for one-storey residences, two-storey residences, and apartments; that these plans clearly locating all outlets, be incorporated in a pamphlet with just enough reading matter to make simple explanations. The pamphlet should be in attractive, even artistic form, showing interior views of rooms with everything in the way of furniture and fixtures in good taste, and on the page opposite to each of these pictures should be a diagram indicating the position of outlets necessary according to the latest good practice. Such a pamphlet should be entirely suitable for an architect to hand over to a client as a basis

A contractor writes:—"I am disappointed when I see so much building going on, that out of all the trades, the electrical is the only one being skinned."

a study and decision on the electrical requirements of the home. Leading to this purpose, it would be well to briefly emphasize two points, namely—the economy to the owner or tenant by having the wiring provided in complete fashion as a part of the original work, together with the unquestionable value to the premises, either for sale or for lease, by the inclusion of such electrical facilities with their strong appeal to every housewife. This pamphlet should be placed in the hands of every architect and builder with the advice that additional copies may be had for the asking.

Third. Field men of ability and training should be employed whose business it would be to make personal calls upon architects and builders and with the above described pamphlet in hand review its picture story and satisfactorily explain any application not clear or not fully accepted. At the same time this expert should acquaint his man with the merits of the present offer of co-operation from the electrical industry, reaffirming the premises herein set forth. It is believed that interviews of this character, undertaken by high class men, will lead to a better understanding with results pleasing not only to the architects and builders but to their clients.

Fourth. It is recommended that a substantial proportion of the local newspaper advertising done by the central stations and contractor-dealers, in their appeal to the public, be concentrated on the complete wiring of the home. Such copy should occupy perhaps a half-page of the paper and contain the floor plans clearly diagramed with the location of washing machine, ironing machine, electric range, dishwasher, vacuum cleaner and sewing machine, etc., with respective outlets, indicated just as boldly as the location of the bath tub or kitchen sink. As a matter of course, outlets should be indicated for the accommodation of various table devices employed in the dining room and the kitchen, also for electric heater in the living room, bath room, etc. As for lights, the outlets for piano lamp and table portables would be as prominent as the outlets for the customary ceiling and wall fixtures. The advertisement should be topped with directions that would cause the prospective home builder to cut it from the newspaper and keep it against the day construction would start. Each and every one of these ads. should carry the injunction to use only high class material to insure reliable service and ultimate economy. These same floor plans, accompanied by a modified appeal, should be occasionally run with the object of accomplishing the wiring of old homes, the owners or tenants of which being shown that extensions by means of surface raceways are neither unsightly nor very expensive. Better resort to this remedy than go without electricity's aids.

Fifth. Electrical manufacturers, particularly those producing devices and appliances for domestic utility, do a great deal of national advertising. Arrangements should be made ensuring that each and every one of these ads. carry some uniform slogan which might read about as follows and be blocked off in form to attract the reader's attention:

> "Wire the home complete for sufficient, convenient and decorative illumination as well as for the use of modern labor-saving appliances. Enjoy the comforts of electricity. Insist on quality materials throughout."

An advertisement including this feature will send the electrical idea to the public because it carries a broader and more effective appeal than one devoted wholly to proclaiming the exclusive virtues of the advertiser's own goods. We want team work in this national advertising for the advancement of the general cause.

All the expense of the several activities ought to be assumed by the industry which only asks the architect and builder to accept in good spirit its tender of constructive co-operation.

Montreal Get-Together Meeting Has Produced Results Already—French and English Sections Formed

The visit of Messrs. Goodwin and Chase to Montreal has already produced results. The convention has been followed by prompt action on the part of the contractor-dealers, and at a meeting held in the Builders' Exchange on Thursday, March 11th, it was decided to inaugurate a vigorous policy of co-operation between the contractor-dealers, jobbers and manufacturers.

A circular was sent out to a very large number of contractor-dealers, suggesting the formation of a strong association, it being stated that the wholesale houses had promised if a live association is formed to give their hearty support and co-operation. The circular also stated that such an association would be able to deal with the wholesale houses to their mutual advantage. The circular was signed by Messrs. F. J. Parsons and R. Moncel.

The meeting, which was presided over by Mr. Moncel, manifested a strong determination to build up an effective organization. Two sections are to be formed, one English and the other French, Mr. J. St. Amour undertaking to organize his French confreres. The present intention is for the English members to remain as a section of the Builders' Exchange, and to co-operate with the French section. The idea is to hold weekly meetings of each section, with a monthly meeting of the two sections combined.

Mr. W. B. Shaw was the first speaker, and he urged the necessity of the contractor-dealers getting together He pointed out that both the manufacturers and the jobbers had associations, and that it was necessary for the protection of the contractor-dealers that they should also combine. In this way they would be able to command a respect from the manufacturers which was now conspicuously absent.

Mr. St. Amour was in favor of two sections, and he also outlined a scheme for co-operative buying. He said that the French contractors would prefer to have a separate organization independent of the Builders' Exchange, but co-operating with the English section.

Mr. Shaw expressed doubts as to the feasibility of co-operative buying, especially in view of the large amount of capital which would be required.

Mr. St. Amour replied that he intended his scheme to be understood in a limited sense only. He gave instances where jobbers were selling to contractor dealers' customers at wholesale prices, and were also willing to supply labor at very low prices. Mr. St. Amour urged that the men should undergo an examination for competency.

Mr. Mix gave his experience of men who held certificates of competency in Halifax. He said that he obtained four men from the union, holding certificates, and that they stayed one day.

Mr. Shaw pointed out that in Montreal none except licensed wiremen were supposed to do work, and that contractors also had to be licensed. The only trouble was putting the act into force.

A general discussion on the question of overhead and the amount of protection which ought to be secured from the manufacturers, followed. It was insisted that the contractor-dealers were entitled to a substantial protection against manufacturers selling to consumers, and it was decided to discuss this matter in detail at a later date. The meeting also discussed in a general way the question of open tenders, and the time and material plan. These questions, too, will come up at subsequent meetings.

The English section of the Association held another meeting on March 18th, when it was decided to hold meetings every Thursday: one week it will be held at 4 o'clock and the following week at 8 o'clock in the evening.

Mr. St. Amour reported that the French section had appointed Mr. N. Simoneau president, and Mr. N. Tremblay secretary. The section had taken up with the Provincial authorities the regulations for installing electrical wiring, etc., in edifices, legislation having been enacted for the better protection from fire. The regulations make provision for the licensing of contractors and workmen, and for the appointment of a board of examiners, who will pass on plans, and will also conduct the examination of workmen, the basis of the examination being the National Electrical Code. The license fee for contractors is $25.00 per annum, while a temporary license will cost $50.00.

Messrs. Shaw, McGregor, and Moncel were appointed a committee to confer with the French section on these regulations.

Messrs. Mead, Gunn and Anderson were selected to consider a constitution and by-laws.

Mr. D. K. Trotter was appointed secretary of the section.

The meeting then discussed the matter of a standard wage in relation to unions. The question largely ranged around the point as to whether a standard wage with a minimum was preferable to a system under which each man was paid according to his ability. While the wage question was regarded as important it was insisted by some speakers that the most vital matter was protection by jobbers and manufacturers, and instances were quoted of wiremen bidding against contractors on the basis of being paid for time and securing material at wholesale prices for the benefit of the consumer. It was also pointed out that all kinds of traders outside of the contractor dealers were selling electrical supplies at cut rates, an dthat it was the absolute duty of the contractor dealer to stop these practices by taking up the matter with the jobbers and manufacturers.

Uncle Hiram Turns on the Switch

Several months after Uncle Hiram gave Bob Henderson the tin of soap, Brown, Bob's boss, went out of business. Bob took over the store, but was not very satisfied with the result. The fact was that the people had continued to deal from Brown because of the long years he had been in business, but now that Bob had taken it over they felt that sentiment ended with Brown's retirement.

One day Uncle Hiram was in the store. Bob told his woes to the old man, and ended up by saying: "Now Uncle you were the first to put ambition into me and it resulted in my taking over this store; it is up to you to help me out."

Uncle Hiram looked at Bob for a moment and then said: "Me an' our Jim wuz at ther movies tuther night, an' they puts on a filum 'bout airyplanes in France. They showed one big feller bein' brung outer its hut, which wuz sumpin like a big dog kenul. Well, wen they gits it inter the middle of ther field, a feller clumbs inter the airyplane and another feller he gits hold o' the propeller an' swings her round. Then he stops an sez sumpin to the feller in the plane, who does sumpin and then ther feller at ther proppeller swings her again and this time she goes on her own. I sez ter Jim, what did that feller say to tuther feller, an' our Jim; who wuz with the airyplanes, sez, why dad he sed 'Contact sir.' And what did ther feller do, Jim, I sez, and Jim sez, why he pushes over ther switch and that causes a spark which explodes the gas and so starts ther engine.

"Well Bob, this yer store is the airyplane, you is ther same."

"I don't quite get you, Uncle."

"Well Bob, this yer store is the airyplane, you is ther driver and the people of ther town is ther folks wot as ter swing ther propeller. The propeller is the business needed ter mak the airyplane go. The folks are yelling 'contact' sure nuff, but yer air not pushing the switch."

"Say Uncle, I get you this time. You want me to get out among the people and canvass for more wiring and putting in better fixtures and so forth. Sure! a wink is as good as a nod to a blind horse."

March Meeting of Toronto Contractors

The regular monthly meeting of the Toronto Electrical Contractors' Association was of special interest on account of an address by Mr. C. A. McLean, general manager of The Masco Company, on the subject "Some Mutual Problems of the Contractor-Dealer and the Jobber." Mr. McLean said in part:

There is one fundamental problem—to distribute goods from the point of manufacture to the point of consumption with the greatest benefit to all concerned; not, as formerly thought, with greatest profit to the particular individual concerned. This problem can only be solved by proper functioning of each division of the industry. Hence, to obtain proper functioning, is the means to the solution of the problem.

The functions of the manufacturer are, roughly speaking, as follows:

1. To make goods of a type and quality suited to the changing needs of the day.
2. To advertise the merits of his goods.
3. To pack them in the most convenient form for distribution.
4. To ship in quantities only, to central points, for redistribution.

The functions of the jobber are:—

1. To serve a definite area by bringing in goods in standard packages from manufacturers and redistributing to contractor-dealers as needed.
2. To help his sales outlets—the contractor-dealers—build up their market.
3. To finance the handling of goods from the time they reach him until the contractor-dealer can sell or install them.

The functions of the contractor-dealer are:

1. To bring the merits of goods before the ultimate consumer by local display, advertising, and personal selling.
2. To install goods and instruct customers in the use of the same.
3. To develop the consumers need and desire for new goods.

Where the natural established channels of trade, as indicated above, are diverted by any one member attempting to function outside his sphere of action, the regular movement of goods is hindered all along the line, and the consumer in general suffers as a result. Only by each member understanding, not only his own function, but the function of the other fellow, and insisting that the trade movements be not so hindered, can we progress smoothly to the ultimate solution of the economical distribution of goods with the maximum benefit to all concerned, including the consumer. Short cuts of: manufacturer to consumer; bargain days; wholesale and retail, are detrimental because they are not permanent; they convey, often, false impressions of values; and constructive trade building is hindered or stopped entirely where these practices are prevalent.

The directors of the Southern Canada Power Company have declared the initial quarterly dividend of 1½ per cent. on the 6 per cent. cumulative stock of the enterprise.

The Awakening of Dealer Lumsden

Lumsden, With the Aid of His Friend Brown, Launches a New Scheme For Selling Appliances

Brown entered Lumsden's store one day on his regular business trip, and greeted the dealer with

"Hello Lumsden, what's the good word?"

"Why, hello Brown, oh everything's fine and dandy. I'm ready to launch a new scheme, but there's just one thing wanting, and you can help me in that."

"Im ready to do what I can, as you know; but what's wanting?"

"Oh, only the scheme."

"Um—only, that sounds to me like everything."

"So it is, and that is why I am glad to see you. I have been thinking over your scheme for selling on the installment plan, and have decided, for the time being, that it is not feasible as far as I am concerned."

"Oh, how's that?"

"Well, I can't finance it yet."

"You've been making quite a lot of money lately, haven't you?"

"Yes, but I have sunk all that in improvements."

"Well, you know that our firm would not be hard on you for payments."

"Yes, thanks to you. Still I do not want to embarrass myself just yet. If business continues to improve as at present, I shall be able to handle the installment plan with my own capital in a few months time. In the meantime, I want to get busy on some new scheme for introducing labor-saving methods into the homes of the people."

"I believe you ars right. Have you thought of anything at all?"

"No, except that instead of demonstrating in the homes, as with my last scheme, I want to educate the people to come to the store and see the demonstrations. You see, as I figure it out, when I take a washer to the home, as a loan for one washing day, the people at that house, see only the washer, whereas if they come to the store they see many other things, and thus may be induced to buy."

"True, oh logician. As a matter of fact I have been giving the subject some thought of late, and have mapped out a rough plan."

"Good, what is it?"

Before answering, Brown led the way to the room in the rear of the store, where Lumsden was in the habit of demonstrating his larger appliances. He looked round the room for a minute or two and then said:

"My idea is to fit up one of every kind of appliance in your stock, so that it can be demonstrated practically. Then advertise in the daily papers that from the next month you will be prepared to thoroughly demonstrate the several labor-saving devices offered for sale. Get the world coming your way. Announce that you will give an electric grill or some other appliance as a prize to the person writing the best description of the good qualities of any one of the appliances demonstrated. The account must not exceed one sheet of foolscap. Add, that all competitors will be free to ask the demonstrator as many questions as they please."

"That's a good idea, and with a little arranging I can acquire a good mailing list which I can follow up."

"That is true. Of course you must arrange to have some outsider judge the papers."

"That's a good job for you, Brown."

"By Jove, and I'll do it"

"You will?"

"I sure will."

"That's real good of you, Brown."

"Not at all. I am thoroughly interested in your efforts, and will always be pleased to help you out."

"Very well, that is settled. Now, I have another idea."

"What is it?"

"I have been thinking of the advertising in the paper, and I think I can work a scheme whereby I can get free advertising."

"Good for you, but if you can get a paper to give you free advertising you are more clever than I believed, and I have a pretty high opinion of your ability just now."

"Oh, it's a simple and by no means an original idea. I will make arrangements with the advertising manager of the paper to print in addition to the advertisement, but on another page, a coupon something like this:" and Lumsden sketched the following:

Electric Appliance Competition
at Lumsden's Store
124 Fairview

Name ... ...
Address .. . .
....

For information concerning the Competition
see advertisement on Page 2.
Every essay must have one of these coupons
attached.

"In the advertisement I will have announced that competitors need not confine themselves to one essay, but each essay must be accompanied with a coupon. This will increase the sales of the newspaper."

"Gee whiz, Lumsden, you sure are coming out. I think the combination ought to make things hum."

"Yes, I believe it will. There are a few small details to be worked out, but I will get busy on those to-morrow and get the scheme working as soon as possible."

Lumsden gets the world coming his way.

"Good for you. Now, how about an order," and the two men plunged into the business of buying and selling.

Two weeks later Brown called round at the store to see how things were going. He guessed that Lumsden had been successful with his advertising plan, because the paper was running the advertisement as they had planned it out. He chose the afternoon for his call, at the time he knew the ladies were most free to do their shopping. He found Lumsden, his wife, and the assistant, all busy explaining to a number of eager ladies the mysteries and good points of the various appliances. Mrs. Lumsden was working with the cooking appliances, and was giving practical demonstrations. The room was filled with the pleasant odor of cooking, and the hum of the working machines. Everyone appeared to be deeply interested.

At the end of the month Brown received a huge pile of MSS. and looked at them a little ruefully at first. He remembered, however, that it meant in all probability more business for both his friend and himself. It took him some time to wade through the papers, and he found it a rather difficult task to choose the best. They all showed plainly that the competitors, for the most part, had not wasted their time; and if they could write such convincing proofs of the good qualities of the various appliances, they must surely have convinced themselves of the value of such appliances.

Finally he chose six of the best papers and got his sales manager to help him decide which was the best of the six. The final choice he sent to Lumsden. It was a paper on the dish washing machine.

A week later, as he was walking through the office, he ran into Lumsden.

"Hello, Lumsden old man, what are you doing here?"

"Looking for you. I want to place an order."

"Good! How did the scheme turn out?"

"It was the best yet. I have sold a quantity of appliances as the result. The best sale of all was the sale of a dishwasher to the lady who won the prize. You will remember that she wrote about that machine."

"I am certainly glad to hear it. Come and have lunch with me, and we will talk business afterwards. I owe you a lunch anyway and you have certainly put me in a good humor. If there is one person I am at present more delighted with than you, it is myself."

New Canadian Enterprise

The recent incorporation of the Diamond State Fibre Company of Canada, Ltd., is a matter of considerable interest to industrial Canada. This company is incorporated to engage in the manufacture and sale of vulcanized fibre and its products. The material it manufactures is known as "Diamond Fibre." Fibre has an extensive and varied use in the electrical and mechanical fields. In the electrical field it is used for insulating bushings, gaskets, washers, wire conduits, handles, track insulation, etc. In the mechancal field it is used for noiseless gears, discs, wheels, timer rings, frictions, bearings, etc. It is also extensively used in the manufacture of trunks, suit cases, trucks, barrels, baskets, boxes, etc. It has practically an unlimited use in modern industry. At the present time the Canadian company will not manufacture the raw material, but will import from the Maidstone, England, mill of the Diamond State Fibre Company or from the Bridgeport, Penna., mill, and machine the finished products in Canada. The Company is fully equipped for the fabrication of fibre specialties. A large and complete stock of the basic material in sheets, rods, and tubes will be carried at all times. It is understood that just as soon as the demand warrants, a mill for the manufacture of the raw material will be erected in Canada.

The Diamond State Fibre Company is claimed to be the world's largest manufacturer of vulcanized fibre. In the Empire it has large mills and factories at Maidstone and London, England. In the United States its mills and factries are located at Bridgeport, Pa., West Conshohocken, Pa., Elsmere, Del., Boston, Mass., and Chicago,, Ill.

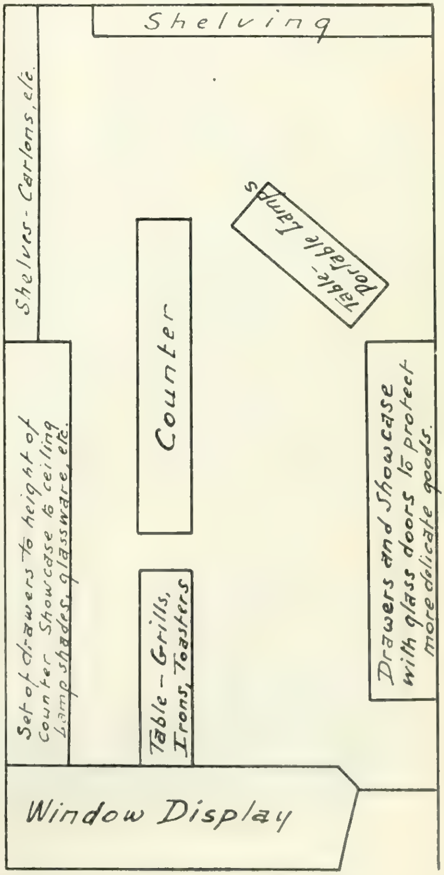
The Company is now prepared to give the best service to the Canadian market. Heretofore it was necessary for Canadian buyers to import the material from the United States, which caused much delay in putting shipments through the customs and securing delivery. With the establishment of the Canadian company this difficulty is eliminated.

Mr. T. Elwood Webster is managing director of the Canadian company, with offices at the Toronto factory, 455 King Street West.

Some Hints on Interior Store Display

A great deal of the attractiveness of a store is found in its arrangement for display. Undoubtedly the showcase is the best method of displaying goods, but whether or not this method is used, there should be some system adopted by which an appeal is made. The average shopper does not want to enter a store and find everything placed haphazard, or without relation to the other articles in close proximity. To have a percolator wedged in between several heaters, or a grill surrounded by a number of flashlights does not usually appeal to the customer as being orderly or arranged to please. This difficulty is eliminated by the right use of tables and showcases. Many contractor dealers, opening a store for the first time, appear to make the mistake of sinking all their capital in stock, to the utter neglect of means by which to show that stock.

Another good point in the arranging of a store is to have the best selling articles at the rear of the store so that cus-


Shelving
Shelves - Cartons, etc.
table - portable Lamps
Counter
Set of drawers to height of Counter Showcase to ceiling Lamp shades, glassware, etc.
Table - Grills, Irons, Toasters
Drawers and Showcase with glass doors to protect more delicate goods.
Window Display

A carefully planned store

tomers will glance over the other articles whilst looking for the one they have come to buy. Many an enquiry will result from such an arrangement.

The accompanying sketch shows the plan of a store with an unusually fine showcase display. On the right hand as the customer enters the store is a showcase which is built up to the ceiling. It is fitted with sliding doors. On the left hand side of the store, behind the counter, is a similar case, with the exception that the bottom part consists of drawers. These cases run half the length of the store and are of the type used by jewellers. Goods of the kind likely to tarnish, or shades likely to become shop soiled, are displayed in these cases. The sliding doors make them easily accessible for inspection by customers. The woodwork is of oak, polished to a dark finish, as is also that of the two tables. Tables are useful for a certain amount of display, but they take up room which in a showcase of the same height could be used to better advantage. In the sketch the space underneath one of the tables is used for a display of heaters. This is unsatisfactory as they give the appearance of being placed out of the way, rather than for display. Then too, goods in such a position do not get the light necessary to show them up to the best advantage; this fault is avoided when goods are shown in a counter showcase. The shelving is all at the back of the store, and thus the one portion of store equipment which is most difficult to keep neat, is relegated to a position least likely to come under the criticism of a fussy customer.

The Jewell Bonus Scheme

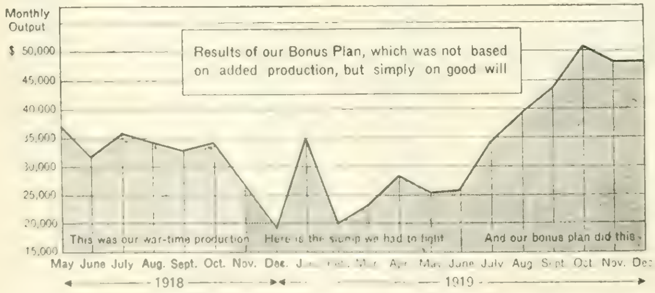
The Jewell Electrical Instrument Company have worked out a most interesting bonus scheme for their employees, which has resulted in almost doubling the output without any material increase in the staff. The cut shown herewith indicates that during the winter months of 1918-1919 their production had fallen to a very low point. In the early summer the bonus system was inaugurated and the chart shows that up to the end of the year a very remarkable increase in production resulted. Mr. Orval Simpson, president of the company, states that the arrangement was an exceedingly simple one. They merely arranged to pay, each month, to 1/12 of their total number of workers, an extra 8 per cent. of the workers' earnings. The result was that the output, which had been hovering around the $25,000 mark each month for seven months, jumped to $35,000 in July and continued to go up until October, November and December figures were just twice the average monthly output of the first six months of the year. Not only that, Mr. Simpson says, but there was no longer any unrest or dissatisfaction among the workers.

In paying the bonus, the employees had been divided into 12 groups, so that the demand on the company would not be so great at any one time. In starting the system, group No. 1 received one month's bonus; the next month group No. 2 received two months' bonus; the following month group No. 3 received three months' bonus, and so on up to the twelfth month, when group No. 12 will receive a full 12 months' bonus. After that date, each group, as it recurs, will receive a full 12 months' bonus. Each group contains certain men from the different departments. This arrangement was accepted partly because it allowed recognition of the older employees in the first groups and partly also because the receipt of these bonuses by one and another in each department reminded the others that at a later date they too would be in receipt of a bonus. Mr. Simpson claims that this bonus plan treats everyone alike —office force and shop employees, executive and night watchman. Any one group cannot complain of treatment inferior to what another group gets. And because it does this, it has produced harmony among the workers, unity of purpose and an enthusiasm which had never before been known in their plant.

The Jewell Electrical Instrument Company recently appointed Mr. Frank T. Groome, Toronto, their Canadian agent.

Montreal Electric Club Luncheon

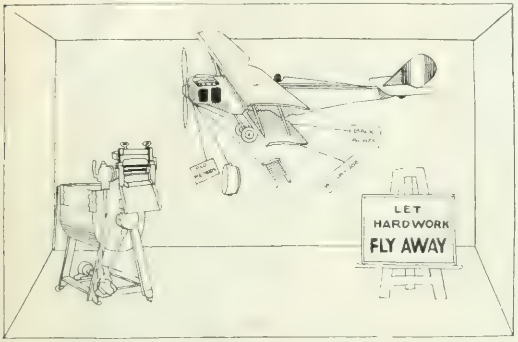
"The Part of Physical Culture in the Maintenance of Health" was the subject of a talk by Mr. M. F. Burey, physical director of the Y. M. C. A., at the meeting of the Montreal Electrical Luncheon on March 24. After emphasizing the importance of production in individual and national life, the speaker remarked that electricians would not think of placing too great a load on a motor, and in the same way men should not attempt to carry too great a business load; if they did, a breakdown was inevitable. To maintain production, efficiency was essential and to ensure efficiency, men must take exercise. There was an enormous loss to the community through preventable diseases, throwing burdens either on families or on the community. The place of exercise in maintaining health could scarcely be overrated. Personally he favored outdoor exercise, but owing to various causes, men were often compelled to take indoor exercise. Certainly one form should be taken, as it had a very strong influence in the maintenance of health and in keeping up production.



Note the increase in production during the months August to December with the same staff working under bonus plan for the Jewell Electrical Instrument Company.

A Washing Machine Window

The window suggestion shown in the sketch is designed to meet the demands of a window having limited space, and of the dealer having but a small amount of money to spare for trimmings. The wings, rudder and elevator of the suspended toy aeroplane can be made of stiff cardboard. The various things hanging from the machine can also be of cardboard. The propellor, frame of the fusilage, struts, and frame for wheels should be of wood. The fusilage may be covered either with strong paper or cheap cotton material.



Suggestion for Washing Machine window

The size of the machine should depend upon the size of the window. In a window ten feet long the model should be at least three feet long, although much will depend upon the position of the model in the window. It should be arranged with some reference to perspective.

The easel should be of wood and the sign of stiff cardboard. If the washer is fitted up to demonstrate, better results will be obtained, as a moving object in a window display always attracts a larger crowd.

A Great Co-operation Meeting will be held in the City of Vancouver on Monday and Tuesday, May 31 and June 1. William L. Goodwin, Samuel A. Chase, Harry Kirkland, and it is hoped W. H. Morton, J. M. Wakeman and others will be present. Manufacturers, Central Station Men, Electrical Inspectors, Jobbers, Contractors, Dealers and every section of the Electrical Industry will be represented. If you are an Electrical Man you are welcome. For particulars write the Secretary, Vancouver Association of Electrical Contractors & Dealers, 422 Pacific Building, Vancouver, B. C.

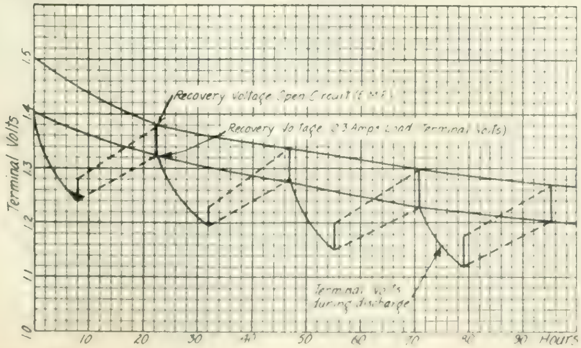
Interesting Battery Tests

The Ontario Hydro Laboratories have just completed tests for the Twin Dry Cell Battery Co., Cleveland, Ohio, of six of their new style twin dry cells. This company is represented in Canada by Mr. Frank T. Groome, Royal Bank Building, Toronto. The following tests were performed and results obtained. These cells have an average open circuit voltage of 1.52 volts when fresh:

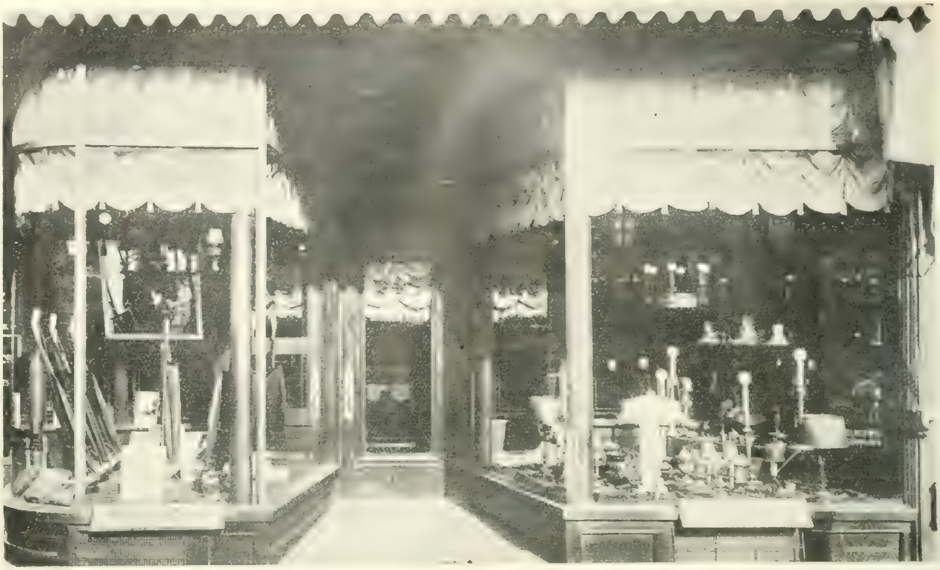
Test A:—Three cells were taken and connected in independent circuits so that each cell caused current to flow through adjustable resistances in its own circuit. In commencing the test, the current from each cell was carefully adjusted to .3 amperes and the three cells were then allowed to run simultaneously and continuously with unchanged resistance adjustments until the terminal voltage dropped to .7 volts. These adjustable resistances had sufficient current-carrying capacity to prevent any variations in resistance due to heating. From this test with this particular load, we found the average life of a (whole) cell to be 230 hours.

Test B: Two of the remaining cells were now taken and connected so that only half of each cell was used. They were put into two of the circuits from which the cells in Test A had been removed. Current in each circuit was adjusted to .6 amperes, and the cells permitted to run continuously until the terminal voltages dropped to .7 volts. The value of the external resistance was unchanged during this test also. Under these conditions the average life (of two cells) appears to be about 25 hours.

Test C: The remaining twin dry cell was given a recuperation test. The current was adjusted to .3 amperes and the cell permitted to run continuously for eight hours. It was now given a test of sixteen hours. After this period of test the load was again thrown on, re-adjusted to the previous (current) value and the load run continued for another eight-hour period following which the cell was given another sixteen hour rest. Readings of terminal voltages were taken during discharge only, and are plotted in full-line curves in Fig. herewith. At each end of each eight hour period the electro-motive force of the cell was measured; these readings are indicated by points shown above the curves of terminal voltage under load. This test was continued for four days and gives a very good idea of the ability of the Twin City Dry Cell to recuperate after service.



These curves show that the life of the battery under intermittent load would be very great as there is evidence that the life curve would eventually become almost horizontal.



McDonald & Willson's Yonge St. Store

In the foreground of the right hand window is a beautiful marble statue of three figures representing the "Three Graces" adapted as a table lamp. On either side of this figure are two handsome polychrome candelabra suitable for living room mantel, or hall console. In two corners of the window are two of the new Estofado lamps with parchment shades, and also luminors for stair posts, or hall mantels. The tall candlesticks in the rear are used on dining room buffets, or in the hall on a console table. On a small console table in the rear is shown three very fine samples of heads carved in marble by some of the best Italian sculptors. Two candlesticks stand immediately behind the heads. The window itself features the polychrome type of fixture which is now so popular for living and dining room.

Several small articles add to the ornamental charm of the window, and a fern placed under the console introduces a touch of nature sufficient to soften the purely ornamental. The floor of the window is covered with a dark green plush.

In the left hand window is shown a neat display of the Apex vacuum cleaner. Several cards announce the good quality and exclusive features of this machine.

New Books

Controllers for Electric Motors—A treatise on the modern industrial controller, together with typical applications to the industries, by Henry Duvall James, B.S., M.E., D. Van Nostrand Company, New York, publishers; price, $3.00. The volume consists of a series of articles originally published in the Electric Journal during 1917-18, together with some new text and illustrations. The object of the book has been to bring the industrial controller art to the attention of technical students, operating engineers, purchasers and users of electrical apparatus, in such a way as to give them a general idea of the principles of operation. The scope of the work may be judged from the chapter headings: Historical; design details; how to read controller diagrams; methods of accelerating motors; starting characteristics of motors with different methods of control; methods of speed control and dynamic braking; direct current magnetic contactor controllers; alternating current controllers; resistors; protective devices; series-parallel control and the electro-pneumatic contactor; voltage control for direct current motors; mine hoists; hydraulic pumps; machine tool controllers; control for machinery requiring low initial speed, such as printing presses and rubber calenders; steel mill floor controllers for auxiliary drive; cranes; car dumpers; ore and coal bridge; coke elevators; electrical equipment for oil wells; locomotives for mines and general industrial purposes.

DEAD or ALIVE

You are to appear at the next meeting of the Toronto District of The Ontario Association of Electrical Contractors and Dealers

APRIL FIRST, 1920, at 7.30 p.m., for DINNER
Board of Trade, Royal Bank Building,
King and Yonge Streets.

By order of Attendance Committee:—
W. M. ANDREW, G. W. BARBER, A. S. EDGAR, C. B. LANGMUIR, C. A. McLEAN, M. S. PIERCE, JOS. ROGERS, L. T. STILES.

COSTS—$1.25 or THIRTY DAYS.

Note that the Jobbers are handling this meeting—No "dead ones" in that organization.

Get-together dinner of Toronto salesmen who testified to their liking for the Hoover Suction Cleaner Note Mr Kelly the General Sales Manager and Mr. Skelton, Chief of the Toronto office

Electric Department of Allen General Supplies

The Allen General Supplies, Limited, Toronto, have organized an electrical department, the sales management being under Mr. L. J. Barry, formerly with the Seymour Power Company. They have recently been appointed by the Howell Electric Motors Company of Howell, Mich., to act as their distributors in the Province of Ontario. The following is a brief description of the Howell motors:

The motors are manufactured in sizes from 1 to 100 h.p., of squirrel cage, constant speed and slip ring variable speed types, for two and three phase circuits of 220, 440, 550 volts, and twenty-five or sixty cycles. In confining themselves to these types, the manufacturers state they are better able to devote their engineering skill to production and service. The motors, it is claimed, have a good starting torque and a better operating power-factor on various loads than is usually obtained with induction motors. The bearings are of automobile bronze made oversize and of the Howell patent rotor recentering type. This means that each bearing is practically two bushings, one of which may be rotated 180° by simply turning a set screw, so that even an unskilled man may re-enter the rotor and restore the original uniformity of airgap in five or ten minutes. This feature is commending itself very strongly to foundry engineers and other blower users, where the shut-down of their motor, due to the rubbing of the rotor, would probably mean the loss of the entire run of metal.

The bare wire that enters into the windings is just baked with a very high resistance enamel before being double cotton covered and "form taped," impregnated and bazed, making this motor particularly adapted for use in damp locations. The rotor end rings are cast directly on the rotor bars, making perfect mechanical and electrical joints, eliminating any possibility of loose connections or throwing of solder. These motors are built and guaranteed for constant full load operation with a temperature rise not to exceed 40° C, or for twenty-five per cent. overload operation, with a rise not exceeding 55° C.

When you 'cut' the price on a contracting job below what it ought to be, you are giving the public something for nothing. This is as wrong morally, as taking payment from your customer for which you give nothing in return.

Distilled Water Bottle and Storage-Battery Fillers

The "Genco" distilled water bottle and storage-battery filler, illustrated herewith, which the General Scientific Equipment Company of Narth Philadelphia, Pa., has developed, is made of glass, holds a half-gallon of distilled water, has a dial cap with a movable indicator to show the last date the battery was filled, while through the fiber cap, and down into the bottle, is a hydrometer syringe, which is used for transferring the water from the bottle to storage-battery cells, and testing the strength of the solution. One advantage accruing from the use of this device is that the distilled water does not come into contact with metal nor is any dirt, dust or grease injected into the cells. Also, the maker points out, by using the syringe of the new outfit there is no chance of overflowing the cells and thus weakening the battery, as often happens when a funnel is used in filling.

Genco distilled-water bottle and storage battery filler.

Many contractor-dealers find that pointers received from salesmen who are really on the job are a very great help, especially if the salesmen be one who studies his line, is observant and has a genuine desire to aid his customers and thus add incidentally to his own sales. Many dealers have been greatly benefited by giving data to salesmen and, in return, receiving from them information very difficult to obtain in any other manner. Salesmen, being continually on the road and in contact with all classes and conditions, develop a broader outlook than local men, and if of the right type, can render invaluable assistance to local contractors by keeping them informed on trade conditions, what other people in the same line are doing, as well as keeping them up to date and imparting to them some of the "pep" [illegible] salesmanship.

Do You Know the Goods in Your Catalog?

Of course you know what lines you carry and you have a proper list of prices. If a customer asks you what an item costs, you can tell him—in a minute anyway. If he asks how a certain thing is made, perhaps you can tell him and perhaps not. If he asks any questions you cannot answer intelligently and without hemming and hawing about it, then you do not create a very favorable impression.

There are some electrical supply salesmen who seem satisfied with a very superficial knowledge of the goods. If they know the facts absolutely essential in making a sale, they are satisfied. That is, if they know enough to write down the proper sizes, the number in a case, the voltage or other necessary technicality, and if they know the terms of shipment and payment, they let it go at that. They think they know enough.

No salesman ever "knew enough" so that there was no need of his learning more. You don't get that way in salesmanship. No salesman ever became so well informed about his goods that it will not pay him to learn more.

Your great study in making a success of your life work of selling should be salesmanship, and a vital part of studying salesmanship is studying your goods. You should inform yourself about their origin, the kind and quality of raw material used in them, the processes of manufacture, the conditions under which they are made and shipped, the best methods of use, the possible ways of misusing or neglecting with undesirable effects.

The time never comes when you can safely stop learning about the goods you sell. You may think you know everything worth knowing about the washing machine you handle or the motor for which your house acts as distributor, but if you take the trouble to get into conversation with users, you soon find them asking questions that have never come up before in your experience.

The younger man who may displace you one of these days is going to get your job away from you because he knows more about the goods. It is that which enables him to sell more goods. He has had less experience in selling and he may know less than you about the human nature part of selling, but he has made a real study of the goods themselves and he can tell a dealer things about his electrical merchandise that he never thought of before.

Carry in your handbag all the time a good book or two on electrical matters and a good trade journal with informative articles and lots of advertising in it. Spend more time reading this sort of matter and less reading the latest edition of some story magazine which has no other value than to make the time pass quickly.

Time is a big part of your capital and the way you use that time has a great deal to do with your success. Time spent reading stories and the latest sporting news may be time agreeably spent, but it is time wasted so far as your business is concerned. It means opportunity thrown away. Time, spare time, is your opportunity to learn more about electrical merchandise. If you persist in wasting the time in riotous reading instead of in learning, you have no one to blame but yourself when you find that you do not know enough about your business to continue to hold your job.—J. K. Blair in Elec. Merchandising.

Some contractors claim that they can do business on 10 and 10. This works out at 17 per cent. on the selling price. Even the Board of Commerce allows 33 per cent.—and there are more indeterminate factors in the contracting business in a week than in the average retail business in a year.

Notes of the Trade

Mr. W. E. Massie, formerly of the Sudbury and Copper Cliff electric railway, has been appointed mechanical superintendent of the Niagara, St. Catharines and Toronto Railway lines.

The speech from the throne in the New Brunswick Legislature forecasted a bill to enable the Government to proceed without delay with the development of such water powers as are found to be commercially feasible.

Mr. Fred Thomson, of the Fred Thomson Company, Limited, Montreal, is, we are glad to learn, on the high road to recovery, after a long illness. Mr. Thomson is now in Philadelphia, where he underwent a serious operation.

The Country Home Electric Company, Limited, Bedford, P. Q., has been incorporated with a capital of $49,000, to deal in, and manufacture electrical apparatus, to construct works for the supply of electricity in the districts of Bedford and St. Francis, and to operate transmission and distribution lines in the districts mentioned.

Mr. F. B. Milligan, former credit man of the Vancouver branch of the Northern Electric, leaves for the East on the first of April to resume duties at the head office of the Northern Electric, in the capacity of assistant general sales manager, covering the whole of Canada.

The Wagner Electric Manufacturing Company of Saint Louis, announces the removal of its Buffalo Office to 16 Carlton Street, and the opening of a service station at the same address. Mr. Alfred W. Baldwin, who has been connected with the company for a number of years, is in charge as branch manager.

The C. F. Atherton Company, of Chicago, have issued a little folder called "Atherton Transformers." This transformer is for bell ringing, light and heavy signalling service and for experimental use. The transformers are manufactured in three sizes, consuming 15, 30 and 60 watts and giving secondary voltages all the way from 6 to 24 volts.

At the annual meeting of the Northern Electric Company, Limited, held in Montreal, the following directors were elected for the ensuing year:—Messrs. Hugh Paton. L. B. McFarlane, H. A. Halligan, P. F. Sise, A. J. Dawes, F. W. Molson, T. Ahearn, H. F. Albright, C. E. Pingree, A. J. Brown. K. C., and J. D. Hathaway. At a subsequent meeting of the directors, Mr. P. F. Sise was elected prisident, and Mr. J. D. Hathaway, vice-president.

The Canadian Electrical Products Company are placing a new immersion water heater on the market. It is claimed that this heater can be used off the lighting circuit as it consumes only six amperes. For this reason it will come within the reach of all householders, as it requires no extra wiring or plumbing. Though the heater is now being placed on the market for the first time, the company have made tests during the past three years which have met their expectations. The heaters will be manufactured in Brantford, Ont. Illustrations of this unit are not yet to hand, but will be shown in an early issue, along with further details.

Now it is the electrically operated chicken ranch. Numerous progressive chicken ranchers, both in British Columbia and in Washington, already have electrified their plants. First the chickens are hatched in electric incubators, regulated by thermostats. The chicks are placed in electric brooders. Then after they mature they are encouraged to lay by electric light. Poultry men tell us that they can obtain as many eggs in winter as in summer by the proper use of electric light, lengthening the day until it is the same the year round.

Well, the chickens always take to the bright lights.—B. C. Buzzer.

Current News and Notes

Bedford, Que.

A new firm under the name of "The Country Home Electric Company, Ltd., with a capital stock of $49,000, has ben incorporated with headquarters at St. Mary of Ely, in the district of Bedford, Quebec. They will manufacture all kinds of electrical instruments and apparatus.

Brandon, Man.

Another recommendation has been made to the city council of Brandon, Man., suggesting electric power to run the pumping of the city water. Mr. G. L. Guy, one of the consulting engineers with the public utilities commission, in a letter addressed to the city council, stated that the Canada Gas and Electric company are willing to supply the power to the city at the rate of 2.8 cents per kilowatt hour. Mr. Guy said that the installation of electric power in the pumping of water would save the city $12,000 per year. The city council did not take any action on the matter, but referred the letter to the waterworks committee.

Brantford, Ont.

The contract for the electric work in the addition to the factory of Messrs Barber,Ellis Ltd. at Brantford, has been let to Messrs T. J. Minnes & Co., 9 King St., Brantford.

Brockville, Ont.

The Canadian Contractors & Builders Ltd., Brockville, are in the market for electric wiring and power regulators.

Hydro-electric power for residences of the front section of the township of Elizabethtown will shortly be an accomplished fact as the result of a decision reached by the township council at a special meeting held here recently. The hydro-electric installation which will follow will be the first in this section, by means of which rural residents will reap the benefits to be derived from connection with the St. Lawrence system.

Calgary, Alta.

The city council of Calgary have passed a recommendation for the purchase of a street railway motor- generator set at approximately $30,000.

Cap De La Madeline, Que.

The contract for electric lighting, for the new church at Cap De La Madeline, has been let to Mr. J. B. Badeaux, 471 St. Maurice St., Three Rivers, Que.

Chatham, Ont.

The Chatham Public Utilities Commission are erecting a new hydro sub-station at a cost of $15,000.

Cobalt, Ont.

It is stated that Mr. Kenneth McDonald, for years superintendent of the Nipissing Central Railway, has resigned.

Edmonton, Alta.

The Edmonton finance committee is recommending the expenditure of $1,000,000 on capital outlays this year. The big item is $750,000 for extensions of the power plant. Telephone extensions will cost approximately $350,000.

Fredericton, N. B.

The announcement of a Government hydro-electric development scheme was made in the speech from the throne, delivered by Lieutenant-Governor Pugsley, at the opening of the New Brunswick Provincial Legislature on March 11th.

Galt, Ont.

The Grand River Railway, at Galt, Ont., have called for tenders for a new transformer sub-station. Plans and specifications are in the hands of the architect, Mr. J. H. Mickler, of Preston, Ont. The building is to be erected at Brantford.

Goderich, Ont.

The Township council of Stanley, Ont., contemplates the installation of a hydro-electric system, and a by-law will be submitted shortly.

London, Ont.

Plans are being prepared for an addition to the Salvation Army hospital at London, Ont., to the extent of $25,000. Prices are wanted on electric lighting. Information can be obtained from Adjt., W. F. Martin, S. A. Citadel, Clarence St., London, or from Brig., C. M. Miller, 20 Albert St., Toronto.

Midland, Ont.

Tenders will be received until April 6th for the electric lighting of the new Sixth Street School at Midland, Ont. The cost of the whole building is $35,000. Plans and specifications with the architect, Hurontario St., Collingwood, Ont.

Montreal, Que.

The city council of Montreal are calling for tenders for transformers and commutators for the waterworks department.

The city council of Montreal is installing two electric pumps at their waterworks, with a capacity of 30 million gallons per day.

Niagara Falls, Ont.

Tenders are to be called for at once for the electric wiring and fixtures in the Technical High School, Epworth Circle, Niagara Falls, Ont. Applications must be addressed to the architect, Mr. C. M. Borter, 102 Main St., Niagara Falls.

Ottawa, Ont.

The contract for power wiring of the Albert St. Technical School, at Ottawa, has been awarded to Mr. Stan. Lewis, of 63 Metcalfe St. Ottawa.

Mr. E. D. K. Mathews, of the electrical branch of the Department of Trade and Commerce, Ottawa, has accepted a position with a large manufacturing concern in England.

The contract for the electric light fixtures and lamps for the Albert St. Technical School, at Ottawa, has been let to the Marchand Electric Co., Bank National Building, Rideau St., Ottawa.

Mr. John W. Wakeley wants estimates for electric light fixtures, etc., for an apartment house. The interior work is just being started. The building is situated at Monk and Centre Streets, Ottawa, and is costing $25,000. Mr. Waleley's address is 594 Driveway West, Ottawa.

Parry Sound, Ont.

The council of Parry Sound will shortly consider the question of purchasing transformers.

Peterboro, Ont.

By a large majority the ratepayers endorsed a by-law providing for a ten-year extension of the tax exemption on the local plant of the Canadian General Electric Co. In return for this the company will make extensive additions to the plant, costing more than a million dollars.

Port Arthur, Ont.

Damage to the extent of $100,000 was caused when a portion of the Port Arthur street car barns and four cars were destroyed.

Port Dalhousie, Ont.

Mr. M. A. Corbett, of Port Dalhousie, wants estimates on electric engines for a pump station with capacity of 5,300 gallons.

St. John, N. B.

A new store has been opened at 30 Charlotte St., St. John, N.B., by Mr. R. F. Jones, for the sale of electrical supplies, fixtures and equipment. Mr. Jones was formerly a member of the firm of Jones Electric Company, and has had wide experience in this line of business.

Stamford, Ont.

Alterations are being made to the community hall at Stamford, Ont. The town council are asking for prices on electric lighting and an electric range. The total cost of alterations will be $12,000.

Sydney, C.B.

Loss estimated at $100,000 was sustained by the Dominion Steel Corporation at Sydney, C.B., when their electrical warehouse was completely destroyed by fire.

Mr. W. I. Faster, assistant engineer of the Dominion Water Powers Branch, Conservation Commission, is in St. John, N. B., in connection with surveys being carried on in relation to hydro-electric possibilities in that province.

Toronto, Ont.

Tenders will be called for shortly for the electric lighting of the new church at the corner of Pape and Harcourt Aves., Toronto. Architect, Mr. L. Wilson Gray, Confederation Life Building, Toronto.

The Board of Control has passed the following resolution on the construction of the Mount Pleasant car line, putting into formal shape what the board had previously decided on: "That the Mount Pleasant road civic car line be built, constructed and equipped at an estimated cost of $1,000,000; that the sum of $117,000 remaining to the credit of by-law No. 7629, which provides for the issue of debentures amounting to $455,961 for building and equipping civic car lines be applied toward the cost of the foregoing work; also that the city apply for a private bill for permission to raise $943,000 for the construction of the Mount Pleasant line, and in view of the favorable vote of the ratepayers, that the Legislature be asked to give the city power to issue the debentures without the consent of the ratepayers. The city council has since voted in favor of the building of the Mount Pleasant line by a vote of 14 to 10. The matter now, therefore, rests with the local legislature.

Thamesville, Ont.

The Zone Township Council is securing estimates for the installation of a hydro power system, and a by-law will be submitted shortly.

Truro, N. S.

The Dominion Chair Co. of Bass River contemplates installing an electric lighting plant.

Vancouver, B.C.

The Western Power Co. of Canada, Ltd., had their warehouse at Stave Falls, B.C., completely destroyed by fire recently. They are to rebuild at once at a cost of $10,000.

The British Columbia Electric Railway Co., Ltd., are intending to lay about one mile of new car line, for which they will need steel rails, and some copper trolley and bonding wire. The line will be on Hastings St. from Renfrew to Boundary Ave., Vancouver, B. C.

The Vancouver World states that "a demonstration will be given in Vancouver of a new "Electric Pig Iron Furnace" for the conversion of British Columbia and other ores into commercial pig iron. A company is being formed which intends to start operations with the installation of a plant with a day capacity of 20 tons of pig iron per day and to increase production by additional units as required.

Windsor, Ont.

Much perturbed at the inability of the Ontario Hydro-Electric Commission to furnish power, the local Chamber of Commerce is considering the advisability of suggesting the erection of a local power house to co-operate with the Commission toward the improvement of the situation.

Winnipeg, Man.

The provincial government of Manitoba is contemplating building a power line from Oakville to Morden via Roland and Carman.

A by-law is to be submitted to the ratepayers of Winnipeg in April for a power plant and heating system for the municipal hospital of the city.

Two hundred municipal reeves of Manitoba have announced their intention of signing a petition to have an electric power transmission line extended to the southern portion of the province. Mr. J. M. Leamy, provincial commissioner, addressed a large meeting in Emerson recently, made up of the reeves of surrounding municipalities, and as a result a petition will be forwarded to the government asking that a line be constructed to that point. This would mean a line 60 miles in length, said Mr. Leamy, at an approximate cost of $3,800 per mile, or $228,000.

Miscellaneous Trade Notes

The Harvey Hubbell Company of Canada have issued a folder on Hubbell Shade Holders.

The Wagner Electric Manufacturing Company, St. Louis, Mo., have issued bulletin 122, entitled "Polyphase Motors." The bulletin is well illustrated.

Mr. Witzel, of the Chrystal Washer Company, reports the sale of a carload of Chrystal Washers to the Fairbanks-Morse Company, for distribution in Western provinces.

What Canada needs, and what the world needs, is **work.** The average workman doesn't seem to realize the seriousness of the economic condition we are facing at the present time.

T. Pringle & Son, Limited, engineers, Montreal, have drawn plans for a small hydro electric plant for the Regent Knitting Mills, St. Jerome. Que. The plant consists of two units each of 200 h.p.

Mr. E. L. Granel, of the Automatic Electric Company, Chicago, gave a lecture on "Automatic Telephones" at the Physics Building, University of Toronto, on Thursday, March 18, at 8.15 p.m., under the auspices of the Engineering Institute of Canada.

The Esterline Company, Indianapolis, Ind., are distributing bulletin No. 395, entitled "Power Factor Recording Instruments." A quantity of useful information is given, including short articles on Low Power Factor and its Evil Effects; Causes of Low Power Factor and their Remedy, followed by a detailed description of their power factor recording instruments.

The George Cutter Company of South Bend, Indiana, announces the acqiusition by the Westinghouse Electric & Manufacturing Company of a financial interest in their company. The management and the commercial policies will remain unchanged, but advantage will be taken of the Westinghouse engineering and other facilities to expand the Cutter Company's activities and develop its lines to enable it to more effectively serve its customers and the industry. The Westinghouse company will operate as sole distributors for the Cutter Company's products.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

PUBLISHING HOUSE of HUGH C MACLEAN LIMITED

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 309 Broadway
CHICAGO - - - 1413 Gt. Northern Bldg.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 **Toronto, April 15, 1920** **No. 8**

Opposition to Electrical Inspection Will Not Remove Its Necessity

When W. L. Goodwin was in Toronto last January he dropped a remark regarding the inspection of electric wiring in the Province of Ontario that has been magnified as to its significance, about a hundred times, by certain interests who have suffered, in the past, from an honest interpretation of the rules and regulations and who, naturally, we suppose, are "sore." At the time, we referred briefly to the remark, well knowing that Mr. Goodwin had not intended to give the impression that would very likely be conveyed to many of his hearers. We are now in receipt of a letter from Mr. Goodwin himself which we reprint elsewhere. If there was any doubt in anyone's mind as to Mr. Goodwin's meaning it is now made abundantly clear that nothing was farther from his intentions than to leave the impression that the present inspection could be done away with without creating chaotic and hazardous conditions.

Electrical inspection is not likely to be popular with the public, because they do not fully understand the insidious dangers lurking in a carelessly executed installation. Unlike most construction work, the excellence or imperfections of which are apparent on the surface, electric wiring lends itself, in a high degree, to consistent roguery. Unlike other imperfect construction work, too, which in the main offends the eye only, electric wiring that is not properly installed is almost certain at some time or other, to yield disastrous results, and therefore in the meantime constitute a menace to property, a life hazard. What the public does not yet understand is simply this: that a proper electric installation is **safe**, while an improper installation is **unsafe**.

It is thus unfortunate that certain newspapers have allowed themselves, during the past few weeks, to be made the tools of these "sore" individuals — either contractors or consumers — and have been led to make statements that do not have their foundations in facts. The inspection of electric wiring, whether administered by the Underwriters or by the Ontario Hydro Department has been, and remains, an absolute essential in safeguarding the property and lives of our citizens. Opposition to inspection can never remove its necessity. Co-operation with the inspectors would, on the other hand, tend to remove many of its objectionable features.

Advisory Conference Committee on Engineering Legislation

In common with their fellows of other provinces, the engineers of Ontario are keenly interested in obtaining suitable legislation to establish their status and to regulate their practice. To accomplish any real results, it was realized that all branches of engineering should be consulted, and that all kinds of divergent opinions must be brought together on common ground.

The Advisory Conference Committee has been formed with this end in view. The committee consists of two representatives of each of the following organizations: Canadian Mining Institute, Engineering Institute of Canada (Ontario Division), American Society of Mechanical Engineers (Ontario Section), American Institute of Electrical Engineers (Toronto Section), Canadian Institute of Chemistry, Association of Ontario Land Surveyors and Ontario Association of Architects.

The above organizations have been chosen as most representative of their respective branches of engineering in Ontario.

Two lengthy sessions have already been held, and much progress has been made towards the establishment of broad general principles upon which legislation should be based. Now that the work is well organized, it is the intention of the committee to pursue the matter vigorously until a conclusion has been reached. The task is not an easy one, and if some considerable span of time should be found necessary to its fulfillment, it will be because the committee wish to be thorough, and to bring in a report, which can be freely endorsed by both parties. The matter is being considered by the committee with a view to meeting the requirements of the different branches of the profession as well as eliminating grounds for objection on the part of any branch, while retaining one general organization of the whole profession. It is perhaps not going too far to say that the result of the conferences already give reason to expect a satisfactory conclusion.

The views of all engineers of Ontario are sought, and many of them may feel free to communicate with the committee to this end. Mr. Clifford E. Smith is chairman; Mr. Willis Chipman, vice-chairman, and Mr. F. R. Ewart, secretary. Communications may be addressed to the latter at 207 Excelsior Life Building, Toronto.

Annual Meeting Electrical Manufacturers

The Canadian Manufacturers of Electrical Supplies held their annual meeting in Toronto on March 25th, 1920. Mr. J. Herbert Hall, president of the association, was in the chair, and outlined briefly the work that the association had accomplished [illegible] He then called upon the secretary and the treasurer for their reports, each of which was satisfactory to the members present.

The election of officers resulted in the unanimous expression of opinion that Mr. Hall should continue in that office for another year. New directors elected to replace those dropping out were Messrs. Leacock, Mack, Balfour, Porte, Duncan and Turnley.

The meeting was addressed by Mr. C. A. McLean, of the Canadian Jobbers' Association; Mr. K. A. McIntyre, of the Association of Electrical Contractors; Mr. C. E. R. Jones, of the Northern Electric Company, Montreal, and others. Mr. McLean outlined at considerable length the function of the jobber and the value of the contractor-dealer to the industry. Mr. McIntyre emphasized the spirit of co-operation that had prevailed between the three organizations during the past year, mentioning a number of questions that had been discussed and were hopeful of early solution. Mr. Jones spoke at some length on the value of a national laboratory as compared with the present situation, where the Underwriters and the Hydro were more or less overlapping.

The meeting was well attended by the most prominent men in the industry, which augers well for the future success of the association.

Montreal Electric Club

Mr. T. B. Macaulay, the chief Canadian exponent of closer relationship between Canada, the British West Indies, and British Guiana, was the speaker at the Montreal Weekly Electrical Luncheon on March 31st. In his remarks, Mr. Macaulay stated that if the waterfalls in the upper part of British Guiana were harnessed, Georgetown would be supplied with power for its street car and lighting systems. Mr. Macaulay was also of the opinion that electricity was destined to play an important part in the British West Indies. In the islands Canadian influence was already very strong from the commercial standpoint, there being banks and various corporations which were controlled by Canadian financiers. The great problem in the development of the British West Indies was that of transportation, and unless Canada take this in hand and link up her railways direct by steamship routes transportation would fall into American hands. In speaking of the need of closer commercial relations he emphasized the disadvantage which Canada and Great Britain suffer at present in regard to adverse exchange rates.

Employees Made Shareholders in Large Plant

Employees of the Pittsburgh, Butler & Harmony Consolidated Railway & Power Co. and its subsidiaries will be given $1,000,000 worth of stock by the company and allowed to select three of their number to represent them on the board of directors of the company. The men named as directors will have a voice in the management of the corporation. About 400 employees are involved in the plan. David L. McCahill, principal owner of the company, evolved the plan. Data and statistics are now being gathered relative to period of service of each man and it is hoped to put the plan into operation at an early date.

The $1,000,000 face value of common stock is to be set aside under a trust agreement with a bank or trust company, and certificates are to be issued to the employees. The fund which will result from the accrued dividends is to be divided equally among all the employees. It is proposed to try the plan for five years. The company is capitalized at $6,300,000, with $1,800,000 in preferred and $4,500,000 in common stock.

Electric Club of Toronto

Mr. W. E. Sprague, secretary of the Canadian Westinghouse Company, Hamilton, was the speaker at the Toronto Electric Club Friday, April 9th., on "The Invention and Development of the Air Brake." Mr. Sprague pointed out that although there had been vast changes in the system of braking since the first crude air brake was put on the market by Mr. Westinghouse in 1869, the original design had been retained. The first air brake was of the "open circuit" system. The "closed circuit" system appeared in 1872 in the form of an automatic brake. Since then the speed, weight and length of trains have enormously increased, and the automatic air brake has been improved to meet these demands. The ordinary passenger train travelling at sixty miles an hour can now be stopped by the modern air brake in sixty seconds.

An Electric-Driven Battleship

The super-dreadnaught Maryland, the fourth battleship of the U. S. Navy to be equipped for electric drive, was launched at Newport News, Va., on March 20. The Maryland is sister ship to the U. S. S. California, launched in November at the Mare Island Navy Yard, California.

The electrical propulsion equipment of the Maryland consists of two General Electric turbo-generator units rated at 11,000 kw. each, one control board, four 7000 h.p. propeller motors of the induction type and six kw. exciter sets. The capacity of the complete power plant for propulsion is 28,000 h.p. In most respects the electrical equipment of the Maryland is similar to that of her predecessors, the California and New Mexico. She is 624 ft. long, displaces 32,000 tons and is equipped to operate at full speed up to 21.5 knots per hour.

Contractors and Central Station in Wiring Campaign

Plans have been completed for an extensive house-wiring campaign in New York City by the United Electric Light & Power Co. working in conjunction with electrical contractors of that city.

The central-station company has prepared advertising matter to reach the public, the principal feature of which will be a series of advertisements in the daily newspapers and which will comprise 27 pieces of individual copy. The financing of the house wiring improvements will be done by the United company through the local electrical contractors the former co-operating with them in order to make the campaign a success. Present indications point to a hearty co-operation between the central-station company and the contractors, and it is expected that a few house-wiring records will be broken.

Big Distribution of Safety Literature

The Ontario Safety League continues to place a large amount of literature in the hands of motorists, school children, industrial workers, and others throughout the Province. In the first three months of 1920, the League has distributed an enormous amount of safety material, including 35,000 industrial safety bulletins; 32,400 school safety bulletins; 8,500 special bulletins; 8,500 traffic bulletins; 2,700 electric railway bulletins; 150,000 motorists safety book-marks; 10,200 health bulletins; 6,500 news letters; 9,000 safety calendars; 12,000 leaflets to the "new man;" 125,000 gummed seals; 3,000 safety cards and posters.

A new company has been incorporated under the name of United Electric Ltd., with headquarters at Regina, Sask. It is capitalized at $25,000.

Report on Possibilities of Provincial Hydro-Electric System in Alberta — Extracts from Paper before Alberta Association of Electrical Engineers

By A. J. Cantin

In making a report on the possibilities of Provincial hydro-electric power, several objects must be kept in mind. These will be treated more generally as we proceed with the consideration of this subject.

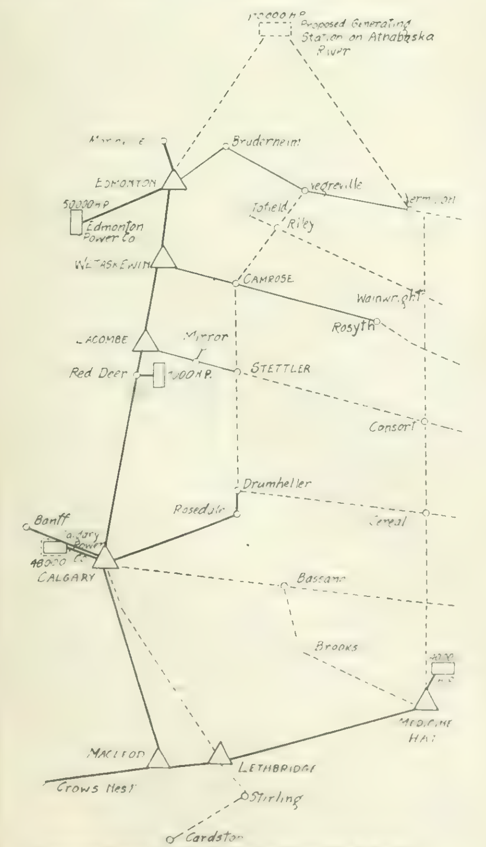
Location of Power Plans

Thirty miles north east of Medicine Hat on the South Saskatchewan river, with a dam 110 feet high, there is 40,000 h.p. available.

Within fifty miles of the city of Calgary there is 60,000 h.p. available; there are at present two power houses with a total capacity of 32,000 h.p. and four more power houses would have to be constructed, and some of the lakes regulated before the full amount of power could be obtained from this river.

On the Red Deer river, near the town of that name, there is 7,000 h.p. available, with a hundred and ten feet head.

On the North Saskatchewan river, at Blue Rapids, with a hundred and ten feet head, between 40,000 to 50,000 h.p. are available.



Suggested layout of distribution and generating system

These various sites, when fully developed, will give over 150,000 h.p., which will likely be enough to take care of power requirements in central and southern Alberta for the next five or ten years.

We are fortunate, however, in having the Athabaska river within reach of practically the whole of Alberta; when that river is fully developed we shall have, between the Pelican Rapids and Ft. McMurray, from 300,000 to 500,000 h.p. which would be enough power for many years to come.

In making the estimates for this report, figures from some of the most reliable firms of manufacturers and contractors in Canada and in the United States were secured. This estimate was made in 1917 at pre-war prices.

A number of private engineering and government reports were also used. The Bow River Power and Storage Investigations, Water Resources Paper No. 2 (which gives full details of the cost and works to be done in developing the Bow river) have been used in compiling the information on this river. I am using my own estimate in all other cases.

Capital Cost (Not Including Athabasca River)

Dams, land, and power houses.....	$8,784,015.00	
Machinery	4,225,800.00	
Engineering and contingency	1,942,861.00	
Interest during construction	815,350.00	
Transmission lines and substations..	4,775,557.00	
		$20,543,583

Annual Charges

Interest 6%	$1,243,765.00	
Sinking fund, 4%, 30 and 40 yr. bonds	240,933.00	
Depreciation	495,525.00	
Operation and maintenance	322,625.00	
		$2,302,848
Estimated gross revenue in 1925...		$2,487,518
Estimated surplus		$184,670

Estimated revenues are based on a rate varying from $19.00 to $40.00 per h.p. year on a peak load basis according to the quantity and distance from power line.

Cost of 13,000 volt line estimated at $2,500.00 per mile.

In making the estimates for transmission lines and sub-stations, the purpose in mind has been to keep the transmission loss to reasonable figures and the fixed charges as low as possible. A 66,000 volt line and transformer station would enable the system to be constructed at a minimum cost, otherwise the cost would be so high that the small towns would be deprived of the service. It is to be expected that the load factor on the system will be low at the start, and transmission loss will not be very high. It will be easier to absorb the transmission loss than to have to pay high fixed charges. When the load has developed to the point where it is no longer economical to operate at 66,000 volts—in the course of ten or twelve years—then a change will be made to 110,000 volts or more. This change—by providing for it—can be made at a minimum cost. By having suspension type insulators the old insulator can be used on the higher voltage by increasing the number of disks, and the copper or aluminum wire used on the new line. Transformers for 66,000 volts can be purchased which, by changing the connections, will serve on the higher voltage.

Have You a March 1, 1918 Copy?

The secretary of the Engineers' Club of Toronto, Mr. R. B. Wolsey, requires a copy of the March 1, 1918, "Electrical News" to complete the Club's files from Jan. 1890 to the present date. Mr. Wolsey would like to hear from any reader of the "Electrical News" who could supply him with a copy of the issue of that date.

Table 1.

Distribution of Developed Water Power in Canada by Provinces and by Use of Power, January 1st, 1920.

	DEVELOPED WATER POWER							
	Total Water-wheel and T'bine Horse Power Installed	Totol Waterwheel and Turbine H P. Installed for use in			Total Horse-Power actually employed	Ultimate Designed Capacity of Plants now operating or under construction in H.P.	Installed H.P. per 1,000 Population	Undeveloped Water Power
		Central Electric Stations	Pulp and Paper Industry	Other Manufactur'g Industries				
1	2	3	4	5	6	7	8	9
Yukon	13,199	10,000	......	......	11,349	13,199	1,467	100,000
British Columbia	308,167	211,043	46,962	46,094	276,795	350,832	429	3,000,000
Alberta	32,992	32,580	.....	17	31,754	33,070	56	466,000
Saskatchewan	......	......	......	......	......	......	....	567,000
Manitoba	83,447	71,790	......	......	75,100	297,047	135	3,218,000
Ontario	1,015,726	794,621	158,095	99,230	934,015	1,460,920	360	5,800,000
Quebec	910,029	623,088	249,332	270,961	838,071	1,146,465	391	6,000,000
New Brunswick	18,080	9,378	2,693	6,009	16,657	29,115	49	300,000
Nova Scotia	34,323	4,064	16,183	12,276	29,359	52,202	66	100,000
Prince Edward Island	1,933	227	......	1,789	1,621	1,958	21	3,000
Totals	2,417,896	1,756,791	473,265	436,376	2,214,721	3,384,808	274	19,554,000

Note.—The central station power listed in Col. 3 is developed for sale. Part is sold to pulp and paper and other industries, and such part is included in Cols. 4 and 5 along with the power that is directly installed in these industries.

There were exported from plants included in the tabulation, 175,000 horse power years in the year ending March 31st, 1919.

Water Power Development in Canada

The Dominion Water Power Branch, Department of the Interior, and the Dominion Bureau of Statistics, Department of Trade and Commerce, have, through co-operation, just completed a census and analysis of the developed water power in Canada. The figures, which are complete to January 1st, 1920, are exceptionally interesting and are indicative of the manner in which the water power resources of the Dominion are being put to advantageous use. Practically every great industrial centre in Canada is now served with hydro-electrical energy and has within easy transmission distance reserves of water power.

According to a recent computation the water power resources of the British Empire have been placed at from 50 to 70 million horse power. This does not include such territories, formerly under control of the Central Powers, as will fall in future under British influence. To this total Canada contributes in the neighborhood of 20 million horse power. This figure represents the power available at sites at which more or less definite information is to hand. Continued investigation will undoubtedly add to this figure.

According to the statistics just compiled there is installed throughout the Dominion some 2,418,000 turbine or water wheel horsepower (Table 1), of which 2,215,000 horsepower is actually and regularly employed in useful work. The larger figure includes the total installed capacity at full gate, including reserve units. It does not, however, include hydraulic exciter units. A large number of the plants now operating are designed for the addition of further units as the market demands. The ultimate capacity of such plants, together with that of new plants now under construction, total some 3,385,000 horse power.

Of the total power installed 1,756,791 h.p. or 72.7 per cent., is installed in central electric stations. Central station power is sold for lighting, mining, electro-chemical and electro-metallurgical industry, milling and general manufacturing. It is apparent, therefore, that the central station total listed in Column 3, includes a portion of the totals listed in Columns 4 and 5, as used in other industries. In the pulp and paper industry 473,265 h.p. is utilized, of which 381,631 h.p. is generated directly from water in pulp and paper establishments, while 91,634 h.p. is purchased from hydro central electric stations.

Hydro power used for other purposes and other industries may be listed as follows:—for lighting purposes, 434,613 h.p.; in mining industry 177,728 h.p.; in flour and grist mills, 42,736 h.p.; in lumber and saw mills, 37,918 h.p.; in other manufacturing industries, 172,955 h.p. These figures are evidence of the widespread manner in which the Dominion's water power resources are being applied to the furtherance of its industrial development. In further reference to the foregoing total of water power developed in Canada, it might be noted that during the fiscal year ending March 31st, 1919, there were exported from plants included in tabulation, 175,000 h.p. years.

Table 2, analysing the number and capacity of the water wheels and turbines installed, is of considerable interest. The total installation of 2,417,896 h.p. is comprised

Table 2

Turbines and water-wheels installed in water power plants in Canada by number and capacity of units and by provinces, January 1st, 1920.

	Total Water-wheels and Turbines Installed H.P.	Units of 100 H P. or under		Units over 100 H P. and under 500 H.P.		Units of 500 H.P. and under 2,000 H.P.		Units of 2,000 H.P and under 5,000 H.P.		Units of 5,000 H.P. and under 10,000 H.P.		Units of 10,000 H.P. and under 20,000 H.P.		Units of 20,000 H.P. and over	
		NO	H P	NO	H P	NO.	H P	NO.	H.P.	NO	H P	NO	H.P	NO	H.P.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Yukon	13,199	6	199		. .	3	3,000	..	......	2	10,000	..	......	..	......
British Columbia	308,167	124	4,396	13	10,498	39	44,573	19	62,100	6	42,000	12	144,600	.	......
Alberta	32,992	[illegible]	492	5	900	.	....	2	8,000	4	23,600	.	......	.	......
Saskatchewan	......				...	.	......	..	......	..	......	..	......	..	......
Manitoba	83,447			1	450	2	1,000	9	35,597	8	46,400	..	......	..	......
Ontario	1,015,726	[illegible]	32,190	182	39,844	147	155,062	77	186,380	14	88,050	36	474,200	2	40,000
Quebec	910,029	893	31,942	189	46,626	140	151,461	51	157,825	22	151,075	20	251,100	6	120,000
New Brunswick	18,080	61	2,084	16	3,696	10	10,300	1	2,000	..	......	..	......	..	.....
Nova Scotia	34,323	324	8,968	68	9,605	19	13,250	1	2,500	..	.....	.	......	..	......
Prince Edward Isl.	1,933	9	1,933			.	....	..	......	..	......	..	......	..	......
Totals	2,417,896	2244	82,204	474	111,619	360	378,646	160	454,402	56	361,125	68	869,900	8	160,000

Table 3

Central electric stations operated by water power—Primary horse power and dynamo capacity installed and capital invested in stations and transmission and distribution systems, January 1, 1920.

	Installed Horse Power in			Total Installed Dynamo Capacity in K.V.A.	Capital Invested	
	Waterwheels and Turbines	Fuel Auxiliaries	Total		Total	Per Horse Power
1	2	3	4	5	6	
Yukon	10,000	......	10,000	6,000	3,471,678	347
British Columbia	211,043	26,780	237,823	154,571	38,450,131	162
Alberta	32,580	2,405	34,985	24,260	6,990,972	214
Saskatchewan	......	......	.	. .	. . .	
Manitoba	71,790	19,400	91,190	62,313	14,340,458	200
Ontario	794,621	39,530	834,151	670,053	170,112,988	215
Quebec	623,088	28,163	651,251	522,461	133,645,655	214
New Brunswick	9,378	500	9,878	6,160	1,543,727	165
Nova Scotia	4,064	420	4,484	3,016	842,122	207
Prince Edward Island	227	......	227	346	67,230	296
Totals	1,756,791	117,198	1,873,989	1,449,180	369,464,961	210

of 3,370 units, of an average capacity of 715 h.p. While 2,244 of these units are of 100 h.p. or under, they contribute only 82,204 h.p. or 3.4 per cent. of the total. A total of 1,845,427, or 76.3% of the whole, is contributed by units of 2000 h.p. and over; 1,391,025 h.p. or 57.6% by units of 5,000 h.p. and over; 1,029,900 h.p. or 42.6% by units of 10,000 h.p. and over; and 10,000 h.p. or 6.6% by units of 20,000 h.p. and over. This table is illustrative of the modern tendency towards the installation of large units. Reference might be made in this connection to the 50,000 h.p. turbines which are contemplated for the new development of the Hydro-electric Power Commission of Ontario at Queenston.

The statistics in Table 3 refer to the developed water power used in connection with the central electric station industry. The central station industry has made great strides in Canada in recent years. A network of transmission systems, which are being rapidly extended from year to year, covers central and southwestern Ontario and southern Quebec. Other systems established in numerous centres from coast to coast are likewise rapidly extending their scope. 91.4 per cent. of the primary power used in the central stations throughout the Dominion is derived from water, evidencing the advantageous location of the water power resources to industrial centres.

The total installed water wheel and turbine horse power in hydro central electric stations is 1,756,791 h.p. Fuel auxiliaries installed as stand-bys to these hydro stations bring the total installed primary capacity up to 1,873,989 h.p. connected to 1,449,180 kv.a. dynamo capacity. The total capacity invested in these central stations, inclusive of transmission and distribution systems, is $369,464,961 or an average of $210 per installed primary horse power.

Of special interest to engineers is the actual cost of construction of hydro-electric power stations, exclusive of transmission and distribution systems. The figures of 70 representative hydro-electric stations throughout the Dominion with an aggregate turbine installation of 745,797 horse power, show a total construction cost of $50,740,468 (pre-war figures) or an average of $69.11 per installed horse power. This cost includes the capital invested in construction of dams, flumes, penstocks, and all hydraulic works, and of power stations and equipment. It excludes real estate and transmission and distribution equipment. The figure, in brief, represents the capital cost of construction at the power site.

With a water power development of 274 h.p. per thousand population, Canada stands well in the forefront in respect to availability and utilization of hydro power resources, being only surpassed in this respect by Norway. The enormous water power reserves still untouched form a substantial basis for the progressive exploitation and development of other natural resources, and, if properly co-ordinated with the development and utilization of the enormous fuel resources of the Dominion, are an assurance of continued industrial expansion and prosperity.

Removal of Inspection Would Result in Utter Chaos—Mr. Goodwin's Views

New York, April 2nd, 1920

Editor Electrical News:—

It has been brought to my attention that certain remarks embodied in my talk before the Electric Banquet during my recent visit to Toronto have been interpreted as indicating that I advocate doing away with the Inspection Department of the Province of Ontario as well as any and all other Inspection Departments.

It is indeed unfortunate that such interpretation should be placed on my remarks. You will no doubt recall the conditions under which this talk was made. About twenty minutes was allowed under conditions not altogether favorable as the attendance largely exceeded comfortable seating arrangements; further, in order to cover as many points as possible, time did not permit detailed discussion.

I am thoroughly in accord and recognize the present necessity of properly constituted, efficient and effective inspection departments, and nothing which I had in mind, nor any knowledge which I have since acquired, leads me to believe that the Hydro inspection is not of this calibre; in fact I was not speaking in specific terms of any inspection department.

There was only one point I attempted to make when I raised the inspection question. I had the ideal condition in my mind, where all workmen would be equally careful and skilled so that the electrical industry would not require any inspection whatsoever. I believe I understand human nature well enough to realize that perhaps the present condition will always prevail, but I recall distinctly stating that our profession should be conducted in such a way that the necessity of departments of the Government scrutinizing our work or activities would be unnecessary.

There was no question in my mind but that the removal of present inspection would result in utter chaos to the electrical industry in the Province of Ontario; perhaps also the present inspection of appliances, as I understand it, is necessary, but again I repeat it is an unfortunate situation, when manufacturers are obliged to submit their devices for inspection by the Government before they can be utilized. It adds to the cost and reflects on the integrity of the competent, faithful manufacturer by classing him with those who do not perform a satisfactory service to society and whose methods make inspection necessary.

Very truly yours,

Wm. L. Goodwin.

Electrical Equipment in Steel Plate Mill

The Dominion Iron and Steel Company, Sydney, Have a Most Modern Installation —Four Thousand Horsepower Motor

By Mr. C. H. Wright

Prior to the war Canada did not produce any steel ships' plates. The rapid increase of steel shipbuilding in Canada increased the demand for steel plates to such an extent that entirely new conditions had to be faced. The Dominion Government decided upon a shipbuilding policy and a contract was entered into between the Dominion Iron & Steel Co., Sydney, and the Canadian Government for the manufacture of ships' plates in large quantities.

Operations for the building of this new plate mill were begun June 13th, 1918, and a plant to the value of approximately $5,000,000 was laid out. At the end of the war, November 11, 1918, conditions changed, and operations ceased for a short time, but a new arrangement was entered into calling for 250,000 tons of plate to be delivered over a period of five years. On July 11, 1919, after some negotiations work was started again on the mill.

A plate, in the parlance of steel mill men, is anything over 3/16 of an inch thick, and the Sydney mill is what is known as a Three High, 110 in. ships' plate mill. It will roll thicknesses from 3/16 to 2¼ in., with widths up to 98 in., and lengths up to 80 ft. The rated capacity of the mill is 500,000 sq. ft., ½ in. plate in 25 hours, approximately 500 tons daily or 12,000 tons per month. The Dominion Government contract may call for a tonnage up to 375,000 tons in the period of five years, not less than 50,000 tons to be delivered annually.

The mill was started formally in February, this year, and has been rolling ever since, and details have been so worked out that the officials of the steel company would make practically no changes of importance in the mill if it were to be re-designed at this date. There is no question but that the Sydney Plate mill is modern in every sense of the word.

What strikes one in going through the mill is the few men actually at work in handling the ingots and plates, and the extreme smoothness with which the various mechanical and electrical operations are carried out. Electric motors perform practically all the work in the plant from the picking up of the cold ingot to the rolling away of the finished sheared and trimmed plate.

The electrical applications are most complete and the substantial way in which the installation has been made will appeal strongly to the operating man. There will, no doubt, be a minimum of shutdowns for electrical repairs, and the cost of up-keep is going to be exceedingly low.

The wiring is most substantial, being placed in conduits underground and overhead with modern pipe fittings, switchboards, control equipment, etc., mounted away from the rolls, beds, etc., of the plate mill. Master control is used in a great many instances, operator being mounted in a pulpit and having a number of master controllers at his hand. From this position he can see easily the operation of the machine he is controlling.

The ingots from which the plates are to be rolled are delivered cold to one end of the plate mill. Their dimensions are dependent upon size of plate to be rolled. They are [illegible] and from [illegible] tons. These ingots are cast and generally poured from the bottom.

The cold ingot is picked up by an electrically-operated crane, and delivered to another crane inside the main building. The electric cranes in the plate mill, of which there are quite a number, are very well equipped. The motors are of standard mill type (MD-250 volts direct current). In the operator's cage the various control equipments are mounted and on the larger cranes magnetic control is used to get proper service on the control equipment. Occasionally magnetic master control is used on the smaller motors to save room and make the operator's duties safer and easier. Plain drum control is used on the smaller motors, but the controllers are over-sized and standardized throughout so that there would be no trouble from burning contact and difficult replacements.

Cranes are wired in accordance with the United States Steel Corporation's standard specifications. The work is very substantial. The trolleys along crane proper consist of standard 1-in. and ⅜-in. rolled wrought iron. Against these the trolley shoes press, and a much better working arrangement is obtained in this way than from the older style of trolley wires, which gave trouble, due to slackness and lack of stiffness. The current is brought to the cranes proper in standard 30 lb. car rails, which are mounted along the girders supporting the cranes. The result of this style of installation is that a great deal of "ginger bread work" is eliminated, and the electrical wiring becomes as substantial as any other part of the installation.

Once the ingot is landed inside the plate mill, it is picked up by a crane carrying a set of tongs, and carried to the re-heating furnaces. Fig. 1 shows this crane carrying a hot ingot from the furnace. It had previously picked this ingot up from the outside crane and carried it into the furnace. The fronts of these furnaces are shown in Fig. 1 with the doors closed.

Doors are raised by 5 h.p. motor located above and beyond the furnaces which are attached to a steel cable running down trolley shoes. The operator for these doors is located in a pulpit at the extreme north end of the building where ingots come in, and at his hand are the various automatic reversing control equipments which control the contactors starting and stopping the 5 h.p. motor. This operator also controls the ingot chariot which may be used to carry the ingot along from the north end of the building instead of using the crane shown in Fig. 1 for all such operations.

The crane in Fig. 1 has one motor for opening and closing the tongs, and another equipment for revolving the tongs, and another for running the tongs in and out. The operator, with the contactors, are shown quite plainly in the cut, and above him can be seen the trolleys, which, in this case, are spiral, and are of the standard section 1 in. x ⅜ in., against which the shoes press. Substantial construction is very well illustrated here.

After the ingot attains a proper heat in these re-heat furnaces it is then drawn by the tongs and brought up to the table and to the main rolls, all operations being electrically controlled.

It is not many years since the plate mill operators, while considering that electricity may be used for the cranes and auxiliary operations, yet did not consider it feasible to operate the main rolls by electric motors. The very best mills, however, are now using motor drive on the main rolls.

In the Sydney plate mill the main roll motor is 4000 h.p. capacity, 82 r.p.m., 6600 volts, with slip ring rotor and resistance control introduced by means of contactor panels. This 4000 h.p. motor is shown in Fig. 2. It is probably the largest motor in Canada. The total weight of the motor and fly wheel is about 330 tons. The weight of the flywheel and shaft is about 155,000 lbs. The diameter of the motor bearings is 20 in., outside diameter of the motor frame, 28 ft. 4 in.; the overall length of motor and wheel, 40 in. The flywheel is shown between the motor and the wall. Between the motor and the rolls there is a breakable spindle, which serves as a mechanical safeguard against over load on the mill. The motor drives a pair of shafts through gears, these in turn driving the main rolls, which are shown on Fig. 3. The main motor operates continually in one direction. This is not a reversing mill, but the plate is passed through and back between the rolls until the desired thickness is obtained.

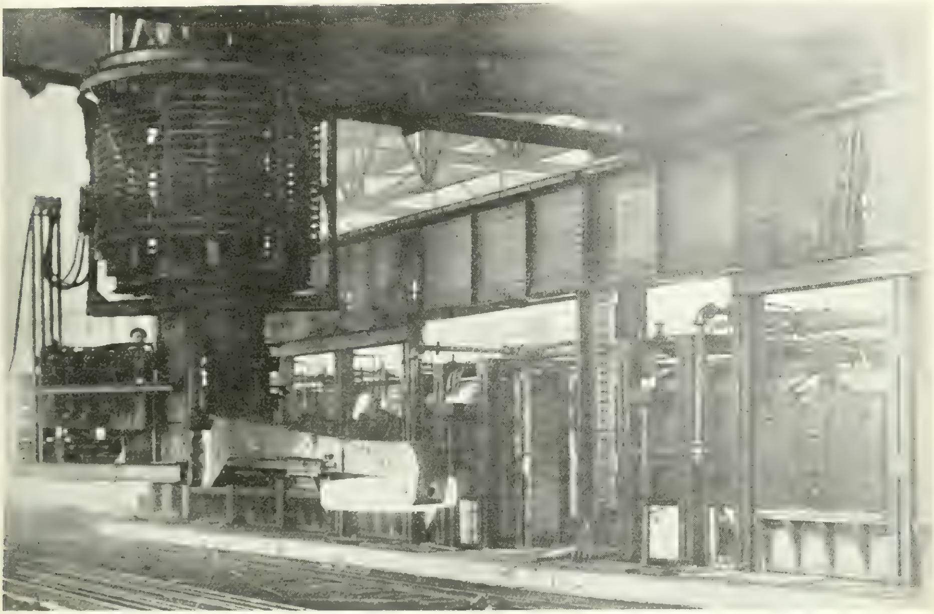


Fig. 1—Crane with tongs carrying hot ingot from furnace Reheat furnaces in the rear

One of the motors operating this process is shown in Fig. 3, below the bed. On the main rolls, motor is direct geared, and is, therefore, of low speed, 82 r.p.m. The power-factor of this motor is, therefore, somewhat lower than it would be in a higher speed machine, but for mechanical reasons the heavy motor was chosen. So large is this motor that it had to be built on the ground, being shipped in sections, the winding being effected while the motor was in process of erection.

The control panels operating the resistances which are introduced in the secondary of this motor are few in number and equipment looks small compared to that of older installations. The motor comes up to speed very quickly, taking a pre-determined current, and on account of the heavy flywheel effect, it is necessary to have a plugging resistance to stop the motor when the power is shut-off, otherwise it would run for hours, wasting valuable time in the mill.

In contrast to this motor operating the main rolls of the plate mill there has been installed in the rail mill, but not yet operating, a 3000 h.p. motor, [illegible] r.p.m., which operates through cut helical gears to the main rolls of the rail mill. The higher speed of this motor gives a better power-factor and the dimensions of the motor are much smaller. What strikes one immediately is the diameter of the shaft of this motor which is only 5 in. The question of power-factor was important in the choice of geared or direct connected motor. Naturally the cost of entire installation is increased considerably by the introduction of the expensive cut gear. This rail mill motor is not yet in operation.

Returning to the main rolls of the mill motor, possibly one of the most interesting applications is that of motors to the middle roll. These two motors (MDS [illegible]) are used to elevate the middle roll until it strikes the top roll. When the middle roll strikes the top roll, the motors and gearing must immediately come to rest, but the motors must continue to exert a torque to press the middle roll against the top roll with a great weight. The speed of travel of the middle roll is approximately 6 in. per se-

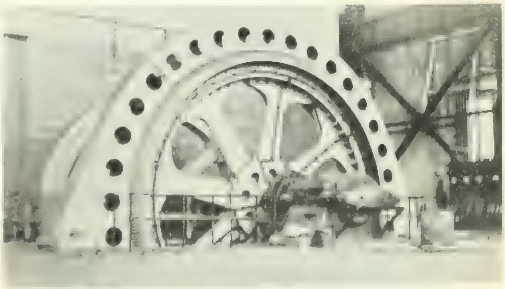


Fig 2—4,000 horse-power motor operating main rolls

ond. When the operator in the pulpit moves the master switch to the lower position, the motor torque holding the middle roll against the top roll is removed, and the middle roll lowers. When it strikes the bottom roll, it must bear down upon it with a considerable pressure, differing from that in the case of the pressure against the upper roll. The rolling distance varies from ½ in. to 20 in., and the speed of the roll is limited by dynamic breaking. The motor is controlled with contactors and master switches, all of which are located at some distance from the main rolls. A number of the control panels are erected side by side at this point with their resistances, etc., immediately behind them, all in a most substantial manner, and standing near the rolls, one hears the constant hammer of the contactors. Controlling machines perform various functions, such as raising and lowering of the table, raising and lowering the middle roll, bringing back and forward the hot plate until it is rolled to the proper thickness and passes on to the next operation.

The service which these control panels give shows the perfection of such control equipment. They function with the minimum of trouble, and this equipment is mechanically as substantial as anything else in the whole mill.

The pulpits are at some distance from certain of the contact panels, but by locating these all together, proper wiring and inspection is facilitated, and a choice can be made to suit good conditions.

After the plates leave the main rolls they have to be levelled and trued. This operation is electrically controlled and plates having been levelled, are carried across a series of conveyors to a point where they may be inspected by turning off. The motors for these operations are located below the floor in concrete beds; their control panels being located some distance away, the operator being in a pulpit considerably above the ground. As an instance of how these motors are applied the following large mill type M.D. motors are used:—

Front and back tilting tables 60 h.p.; lifting rig for tilting table 2-150 h.p. M. D. L09 motors; 110 in. plate mill screwdown 2-100 h.p.; plate leveller 1-40 h.p. M. D. 108; cooling bed tables 4-40 h.p. M. D. L 05 motors; cooling bed chain drive 2-40 h.p., M. D. 105 motors; inspection table, inspection turn-up chain conveyor and rotary shears, each take 40 h.p. motors.

After leaving the inspection tables the plate goes on, and is marked proper size, passing between rotary shears, which true the edges. It then goes on to larger shears which trim the ends, one of which for instance is an 144-in. shear, operated by 200 h.p. motor, of very large dimensions. It is interesting to watch these plates being held on the bed of the shear by the magnets inserted in the bed. Scrap is carried away from the shears by means of motor-operated conveyors, while the plate proper is carried across on a castor bed, which looks like a large number of table legs inverted with their castors in the air. The plate is moved by hand across to scales or other points preparatory to shipment.

The smoothness of operation of this mill makes it a delight to watch, and naturally the demand for power is, at times, enormous. For instance, the 4000 h.p. main roll motor, if it is starting or rolling at the same time as other large operations are going on, the demand on the power house assumes large peaks. The new power house in process of construction is designed for a capacity of 20,000 kw. It is not yet completed, but there will shortly be in operation in that power house something like 12,000 kw. of steam turbo-generators which will deliver current at 2200 volts, 60 cycles, or at 6600 volts, 60 cycles, in the case of the larger units. The 6600 volt current is only handled through motor operated switches, while the 2200 volt current is controlled by solenoid operated switches, the latter on a pipe frame work with a 6600 volt equipment mounted in cells using standard construction of this kind. Conductors form the turbine to the main switchboard consist of bus-bar section carried on standard bus-bar supports in brackets and up along the wall to an outgoing steel tower, suitably designed.

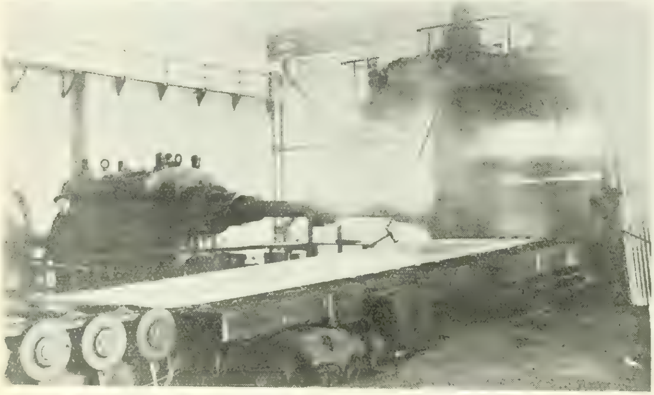


Fig. 3—Main rolls and plate. These rolls are driven by a 4,000 horse power motor, claimed to be the largest yet installed in Canada

Practically all the drives in the plate mill excepting that of the main rolls, are by direct current motors. This direct current is obtained through a 1400 kv.a. synchronous motor driven generator set, located in the same building as the 4000 h.p. main roll motor. These synchronous motor condensing sets for other parts of the plant are suitably located, taking current at 2,300 volts or 6600 volts, 3 phase, and delivering 275 volts direct current.

The consulting engineer for the plate mill and No. 3 power house, above described, was Mr. B. R. Shover, of Pittsburg. The electrical engineer of the Dominion Iron & Steel Co., Sydney, is C. Boucher. The superintendent of the plate mill is Mr. W. G. Wilson. The contractors for the electrical equipment in the plate mill and power house throughout were the Canadian General Electric Co. Ltd.

Proposal for Net-Work of Wireless Communications to Cover the British Empire

The directors of the Marconi Wireless Telegrah Co. have submitted a proposal to the Imperial sub-committee dealing with these matters, for a network of wireless communications to serve the needs of the whole British Empire. The terms upon which the proposal is based are as follows:

1. The Company offers entirely at its own cost, to construct, maintain, and operate a complete and efficient network of Imperial wireless communications, in accordance with the enclosed proposal.

2. The Company will pay yearly into the Treasury of each Government, in whose territory one or more stations may be situated, a sum equal to 25 per cent. of the net profits earned by the said station or stations.

3. On the expiration of a period of thirty years, dating from the inauguration of any wireless service comprised in the network, the stations conducting such service will become, if so desired, the property of the Government or Governments concerned, free of any payment.

4. The Company guarantee to complete the Trunk Stations within a period of three years from the date on which permission to commence work is given.

5. The Government or Governments concerned will have the right to take over the stations at any time by paying for them the value at which they stand in the Company's books, plus any sum which may have been expended on the creation of the services, and by paying to the Company 10 per cent. of the gross receipts for the remainder of a period of thirty years, dating from the inauguration of the services.

6. The Government will have the right to take over the control of the stations during any period of war or national emergency, all arrangements for such control being settled between the fighting services and this Company, and to be subject to periodical revision.

7. This offer is subject to the following conditions:—

(a) That the Government or Governments concerned shall issue all requisite licenses for a period of thirty years, shall grant every facility for the acquisition of sites (by compulsory purchase if necessary) and shall carry out, as a repayment service, the work of building, laying, and maintaining, all the underground and overhead telegraph and telephone lines required. Where such work is not the monopoly of the Government concerned, the Government shall grant all reasonable facilities for carrying out the work.

(b) That the stations, when erected, shall not be diverted from the duties for which they were constructed, except in the event of national emergency.

(c) That the Company shall reserve the right to extend the system to foreign countries to any extent and on any terms that may be commercially advantageous, provided that Imperial traffic shall invariably have preference over foreign traffic.

(d) That the Government or Governments concerned shall secure the allocation of suitable international wavelengths to the stations comprised in the network, and shall see that stations belonging to other companies shall not be allowed to use unscientific apparatus, or granted wavelengths, which would interfere with the working of the Imperial network; and that, except in the event of national emergency, the stations comprised in the network shall not be compelled to communicate with other stations which would interfere with the Imperial services. The Company asks for no monopoly, it is prepared to stand on its own merits. The offer is, however, conditional upon adequate protection on these lines being given to the service.

8. The Company is also prepared to undertake the work of establishing local networks in any country, or district, whether they are required to link up with the Imperial network or not.

9. Where the Government or Governments so desire, the Company is also willing to undertake the construction and maintenance, under similar conditions, of stations for communication with ships at sea and aircraft in flight, and to link up such a system of stations with the main Imperial network should it be practicable to do so.

10. In view of the present trade requirements of the Empire it is urged that this offer may be considered without delay. Should it be entertained, it is proposed that all necessary detailed arrangements between this Company and the Government or Governments concerned shall be elaborated in conference, and that a broadly-worded covering agreement on the lines of this letter shall be completed at the earliest possible date, in order that the work may be put in hand.

Following are the proposed trunk routes and branches:

Route 1.—England to India, and thence to Singapore, Australia and New Zealand, with a branch from Singapore to Hong Kong.

Route 2.—England to Egypt, and thence to East Africa, and South Africa.

Route 2 A.—England to Egypt, and thence to South Africa; with a branch from West Africa to South America.

Route 4.—England to West Indies.

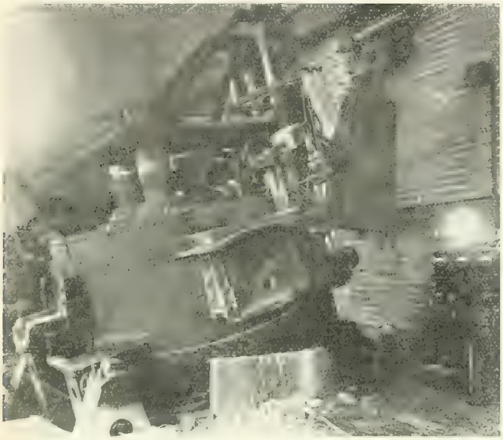
Route 5.—England to Montreal, and thence to Vancouver.

Route 6.—Australia to Vancouver (only night service to begin with).

Mr. R. H. Starr, General Manager, Water Light and Heat Departments of Orillia, Ont. Mr. Starr is also vice-president, for Georgian Bay District, of the Ontario Association of Municipal Electrical Engineers.

Electric Furnaces of Baldwin's Limited, Turning Out Some Fine Castings

The illustration in Fig. 1 shows one of the 3000 h.p. electric furnaces in the plant of Baldwin's Limited, Toronto. The billets produced from these electric furnaces will be used to manufacture tin plate of which the Canadian requirements alone amount to about 200,000 tons per annum. The buildings for the manufacture of the plate are at present under construction and in the meantime the furnaces are being utilized to produce the necessary castings for the plate rolling machinery. Samples of these castings are shown in Fig. 2.



One of the 3,000 h.p. furnaces

The furnace illustrated in Fig. 1 is one of six originally installed by the British Forgings Ltd. and used during the war for the production of high class steel for various munition parts. The plant was recently taken over by Baldwin's Limited who are adding a number of buildings, three of which have areas measuring 73 ft. x 800 ft., 70 ft. x 500 ft. and 48 ft. x 500 ft. respectively. The total floor area under construction measures 117,500 sq. ft.

Personals

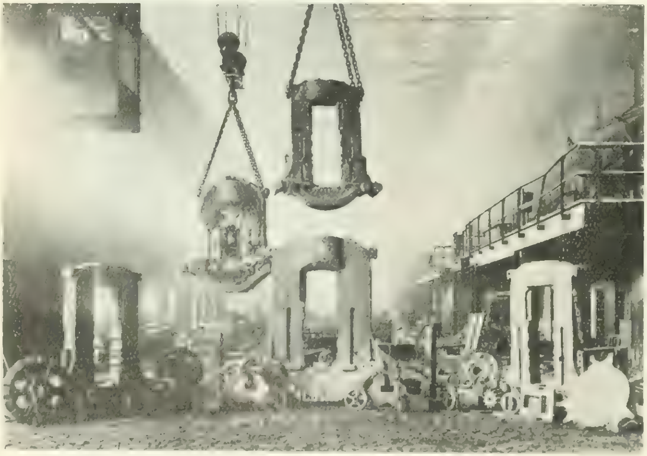
Mr. Charles H. Colby recently resigned his position as operating superintendent for the hydro system in London and left the city early this month to enter the services of the St. Cloud Public Service Company at St. Cloud, Minnesota.

Mr. W. E. Massie, formerly of the Sudbury & Cripple Creek Electric Railway, has been appointed mechanical superintendent of the Niagara, St. Catharines, and Toronto railway lines covering the Niagara district. This railway, owned by the Canadian Government, is being extended and improved.

Mr. J. R. Richardson, of Winnipeg, is dead, in his 59th year. He was for twenty-six years connected with the Bell Telephone Co. in Winnipeg, and at the time the telephone system was taken over by the government had been for several years city manager of the firm. His first position after leaving school was with the North Western Telegraph Co., Montreal.

Mr. J. Walton Peart, B.A., B.Sc., son of J. W. Peart, G.T.R. agent, St. Thomas, has been appointed general supervisor of the Rideau Street sub-station and the Springbank plant of the Public Utilities Commission at London, Ont. Mr. S. J. Dawson will take over the chief operator's position at the main hydro sub-station, and Mr. Robert McCormick will have charge of the Springbank plant. These changes in staff have come about through the resignation of Mr. C. H. Colby.

Mr. Harold S. Johnston, late of Calgary, has recently moved to Halifax, N. S., to accept an appointment as hydraulic engineer of the Nova Scotia Power Commission. Mr. Johnston is a graduate of McGill University and has had extensive experience in hydro-electric work both in Ontario and in Alberta. He was engineer to the Calgary Power Company, for a period of four years, covering the construction of two hydro-electric plants of 30,000 horsepower capacity as well as storage dams incident thereto.



Samples of castings being turned out from the electric furnaces by Baldwins' Limited.

The Contractor-Dealer

Electrical Contractors in Montreal are Organized on a Solid Basis—By-Laws and Constitution Adopted—Discussion of Vexed Questions

The electrical contractor-dealers of Montreal are now organizing on a solid basis. The previous association was of a more or less temporary character, and was brought into being by labor troubles. Following the collapse of the strike, little or nothing was done, although officers were appointed, and one or two meetings held.

The visit of Messrs. Goodwin and Chase stirred up some interest in a get-together movement, and preliminary meetings were held, at which several matters of interest were discussed. On March 25th, at a meeting held at the Builders' Exchange, the real work of organization was carried out a constitution was adopted, and permanent officers were elected. On the motion of Mr. J. M. Walkley, it was agreed to form an electrical contractor-dealers' section of the Builders' Exchange.

The committee on by-laws and constitution presented their report. This was gone through, and after several alterations had been made the following was adopted as the constitution and by-laws:

Article 1—Name.

This section shall be known as the Electrical Contractors and Dealers' section of the Montreal Builders' Exchange, and shall be composed of not less than ten (10) firms engaged as electrical contractors or dealers.

Article 2—Purpose.

The object of this section shall be to promote harmony and justice between employers and employees, and further the interest of its members as follows:

Sec. 1. To promote active interest and co-operation between the members of this section and to render aid and comfort to the different members in time of difficulties when united action may be deemed advisable and beneficial.

Sec. 2. To establish fair and equitable practices for the protection of the electrical trade and the public.

Sec. 3. To secure settlement of difficulties and differences with employees.

Sec. 4. To raise the standard of workmanship in the electrical trade and to promote the efficiency of the mechanics engaged in it by such education and training as may be deemed advisable.

Sec. 5. To advance the interests of the members of this section and other sections and sub-sections as may be beneficial to the building industry.

Article 3.—Membership.

Section 1. Firms eligible for membership in this section shall be members in good standing of the Montreal Builders' Exchange, and such as are recognized by this section as bona fide electrical contractors or dealers.

Section 2. All applications to be investigated by an appointed committee who will report their finding at a meeting before vote is taken on the application.

Section 3. Applications for membership shall be read, at the first regular meeting of this section, following its receipt by the secretary and voted on at the next regular meeting.

Section 4. Majority of votes, of members present is necessary for election.

Section 5. A member of this section in arrears of the membership dues to the Builders' Exchange for six months shall without notice from this section cease to be a member.

Article 4.—Resignations.

Any member wishing to resign from this section shall notify the secretary in writing and such resignation shall be presented at the next regular meeting at which it may be acted upon, and may be accepted by a majority vote at such meeting but no resignation can be considered unless all dues and assessments levied by this section have been discharged.

Article 5.—Officers and Executive.

Section 1. The officers of this section shall consist of a chairman, vice-chairman, and secretary, and an executive committee consisting of the above named officers and two additional members, all of whom shall be elected at the annual meeting and hold office until the succeeding one.

Section 2. A vacancy in the executive shall be immediately filled by its remaining members from the general membership.

Section 3. The executive has power as it deems necessary from time to time to appoint other officers and to define the terms of their appointments and the termination of the same.

Article 6.—Finance.

No expense shall be incurred by this section unless authorized and provided for at a regular or special meeting of this section.

Article 7.—Meetings.

Section 1. The annual meeting of this section shall be held the 1st Monday in Demember of each year.

Section 2. Regular meetings shall be held every Monday.

Section 3. Special meetings shall be called by the secretary, on the receipt of a requisition stating reason for such meeting signed by five members in good standing.

Article 8.—Quorums and Notices of Meetings.

Section 1. One quarter of the members in good standing shall constitute a quorum at any meeting of the section.

Section 2. A simple majority of the executive shall constitute a quorum at its meetings.

Section 3. Seven days' notice of annual meetings must be given and three days' notice of special meetings.

Article 9.—Amendments, etc.

Section 1. Constitution and by-laws may be amended only at an annual meeting of the members of this section, or at a special meeting called for this purpose and only then by at least two-thirds of members present voting in favor of same.

Section 2. Notice of such amendment must be given in writing at least two weeks previous to action being taken upon it.

The following officers were elected: Chairman, Mr. R. Moncel; vice-chairman, Mr. F. J. Parsons; secretary, Mr. D. K. Trotter. Executive, Messrs. H. Vincent and J. M. Walkley.

Mr. R. Moncel, Chairman.
(English Speaking Section)

At a later meeting of the members on March 29th, a discussion on the conditions in the trade resulted in some very plain speaking. The discussion arose out of a motion by Mr. J. M. Walkley appointing a committee to inquire into the conditions of the trade, with a view to obtaining amelioration of grievances, and to consider the general relations between jobbers, manufacturers and contractor-dealers. In Mr. Walkley's opinion, the question of these relations, particularly as to the protection of the contractor-dealer by the manufacturers and jobbers, forms a vital factor in the well-being of the trade. The idea was to receive complaints and suggestions from members of the trade, to formulate these, and then to make up the matter with the manufacturers and jobbers. Mr. Walkley criticized the retail schedules of the manufacturers, and went on to say that the contractor-dealer had absolutely no chance of doing business with those big corporations who were able to buy their goods direct from the manufacturer.

Mr N. Simoneau, Chairman,
(French Speaking Section)

Mr. MacGregor said that it was folly to go after certain jobs because the electrical contractor knew that the firms interested were able to buy as cheaply as the contractor-dealer.

Mr. Gunn: Cheaper than we can.

Mr. Walkley pointed out that firms and individuals who were really part of the public, could obtain articles at very cheap rates by reason of buying a given quantity for one job; whereas, the electrical contractor-dealer did not buy perhaps in such large quantities under one order, but spread his buying over several months, the aggregate however, being larger than the quantities purchased by men who were really not connected with the electrical trade.

Messrs. Barrett and Mead also took part in the discussion.

It was pointed out that some jobbers were really doing a contracting trade, and it was suggested that this was unfair, and that a jobber should either confine himself to the purely jobbing business, or should go into the contracting end.

Mr. J. M. Walkley, Member of Executive

On the question of standard packages the purchasing of condulets was instanced. It was stated that while it would be satisfactory to buy such goods as were in constant use, it was hardly to be expected that contractor-dealers would buy entire packages of condulets which were only used occasionally.

Considerable discussion took place on the question of jobbers and manufacturers supplying men who were not identified with the electrical industry, and it was asserted that the only way to stop such practices was to decline to buy goods from the jobbers and manufacturers who sold to those outside firms. On the other side, Mr. Gunn pointed out, that the jobbers were in business to sell goods, and that the contractor-dealer had not up to the present time attempted to push these goods; they had not been alive to their opportunities, and therefore some other outlet for these goods had been found.

Mr. MacGregor replied that there was not sufficient profit to form an inducement to push the sale of the goods; to which Mr. Gunn replied that it was their business to see that they received a living profit.

The motion was agreed to, Messrs. Walkley, Mead, Gunn and Shaw being appointed to act.

Partial Payments as a Business Asset

By Charles E. Hayes*

There are four major articles sold on time payments at my store—electric cleaners, portable electric sewing machines, ironing machines and washing machines. We take for our cash prices the retail prices set by the manufacturers. We tried out the plan of using the retail price as our time-payment price and offering a 5 per cent. discount for cash. Strange as it may seem that plan did not work out nearly as well as using the retail price as the cash one and adding to it for time payments.

Solicit Free Demonstrations

We do not give a free trial of anything, but do feature and solicit opportunities for free demonstrations in the home. We do have a trial offer that is closely connected with our time-payment plan. On any of the four appliances mentioned we require an initial payment of $10.00. At the end of 30 days the customer has the privilege of doing one of the three things. Paying in full and getting the cash price, making a second payment, or returning the appliance. In the latter case it is understood that no explanation is required, the $10.00 being retained as rent (and it is fair enough rental for both customer and dealer) and the agreement cancelled.

Most of our time payment sales of cleaners and sewing machines are made at $5.00 per month and of ironers and washers at $10.00 per month. For those rates we add 10 per cent. to the retail price. If monthly payments are double those amounts, we add only 5 per cent.

My contract form has been carefully worked out and in its present form is a composite of the best features of several installment forms. It has been designed first to protect my interest, second for brevity and clearness, and finally to require as little filling in as possible by salesmen. Also the fact that it is a rental contract, is not camouflaged.

Delinquent Clause Important

Particular attention is called to a clause "Should payments not be made within the week due, a charge of 5 cents is to be added to contract for each dollar delinquent each week." This I consider a very important item. Without it there is no way of keeping the few slow-pays in line except by bluffing, threatening or finally seizing the appliance.

Ten days after the sale a call is made on the customer to see if everything is all right, or if further explanation or demonstration is necessary. At the end of 30 days call is made again to collect the second payment. This is made necessary because it is until then considered as on trial only. Attention is then called to the fact that future payments are to be made at the store. The customer is at that time given a letter explaining our bonus plan.

A Bonus Plan

Our bonus plan is one of our very best sales helps, ranking with window displays and newspaper advertising. Briefly, we allow to our customers $2.50 on a cleaner or sewing machine sale, and $5.00 on a washer or ironer sale. There are only two simple conditions: first, that name of a prospective buyer must be given to us before sale is made, and second, that sale be made within two months. We do not depend upon verbally telling customers of the plan with consequent chances for questioning, but have it multigraphed on our letterhead with extra identical copies always available.

Have Customers Call At Store

A notice is mailed to reach the customer the day before a payment is due. Of course it is obvious that getting a customer into our store once a month can be made valuable. Full advantage has been taken of this potential opening with very good results. Forty per cent. of payments are made at our store and sixty per cent. through the mails. It is the method of handling these remittances that prompted the opening sentence of this article. Results of calls at the store are dependent upon the methods used and many ideas will at once occur as to how to profit thereby. However, acknowledgement of remittances made by mail may be made equally productive of future sales, and this is a source that is probably overlooked or at least not worked to the fullest extent by dealers.

We acknowledge all mail remittances with a form letter, but each letter is separately typewritten and we find it is actually considered as a personal letter. The first paragraph of two lines thanks the customer for the remittance and states the balance remaining. The balance of the letter is devoted to a short sales talk on some one of the four major appliances that the customer does not own. These sales talks are written by advertising agencies of the manufacturers (as we recognize their superior qualifications in that respect) and letters wind up with the statement that as they are customers of approved credit, we will gladly make any arrangements they wish for demonstration and terms. Booklets on the article described are enclosed. The acknowledgement form is changed each month, even to the first short paragraph, so that a customer will retain the idea that he is being written personal letters.

It should be apparent that customers will make the purchase of the second large appliance from the same dealer to avoid possible embarrassment in opening a time-payment account at another store. However, some effort must be devoted to securing their further business, or they will go elsewhere through pique at indifference or lack of consideration shown them.

Avoid All Concessions

Competition in our line is keen and there is great temptation to give concessions in particular cases. This is strictly avoided, not only for effect on any prospective buyer but because concessions are sure to be told to friends and cause further embarrassment.

All my time payment sales have been carried by me personally, although there are several finance companies, making a business of handling such deals. None I have investigated seem quite fair to the customer or myself.

It should be remembered that purchases on time-payments are made by some because of inability to pay cash, by a few because cash may have been paid for a preceding large appliance and after-service not thought as good as if time-payment plan was held as a club, but the great majority so purchase in order to keep expenditures within a regular monthly allowance or income. It usually may be ascertained which one of those reasons is in the mind of the purchaser and the sale closed that much easier. With these classes in mind, and the scarcely scratched field for electrical appliances in view, a dealer has unlimited opportunities if he masters the subject of selling electrical appliances on time-payments.

Is the Electrical Industry organized in your city? If not Go to Vancouver, B.C., May 31st and June 1st and learn how it is done at the Great Co-operation Meeting

---

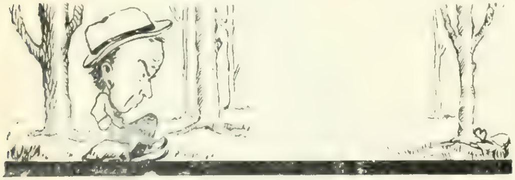
*Hayes Electric Store, in Contact.

The Awakening of Dealer Lumsden

Lumsden Keeps the Ball Rolling—Business and Not Moss is What He Seeks to Gather

Lumsden, after his last campaign got right after things. Ha had a fine list of names to follow up and intended to get after the people while they were still thinking of the demonstrations they had seen in his store. His business was steadily increasing and he had every reason to be satisfied with the results of his previous efforts. But he did not intend to let it rest at that. Once truly ambitious, a man will follow a thing to its limits. Lumsden felt that he had by no means reached the limit of possibilities, as far as the growth of his business was concerned in that neighborhood. His store was becoming a landmark to the community. His window displays were always sure to attract the passers-by and his intensive advertising, along with the various campaigns he had carried out, had made him known beyond what he had at one time considered his selling area. Asked one day by a friend, to what he attributed the sudden growth of his business, he answered by telling him all about the hints his friend Brown had given him and ended up by saying "Handle your store in the way you would your drawing room, that is: keep it clean and attractive, and then—and this is very important—get after business, keep after business, and stay by the job until you get business." All this was very sound, and Lumsden lived up to it with all the strength of his business soul.

Nothing has been said about the assistant that Lumsden had found it necessary to place in his store. This young man had turned out a very fine salesman and had also taken over the dressing of the windows. One display which had attracted a great deal of attention was: a clock in the centre of the window pointing to nine o'clock. Below the clock was an electric washer, and behind the clock was a clothes line hung with clothes. An electric fan placed behind the clothes and in motion kept the clothes moving, thus giving the impression of their being out of doors and blown about by the wind. The clock suggested that all washing was over by nine in the morning. This display sold four machines in the following four days. This young fellow showed such ability that Lumsden had a talk with him one day. The result of that talk was that Andrews was given charge of following up prospects, in addition to his work on the windows. This left Lumsden free to carry out another campaign. As usual he called his friend Brown to a conference at his home. Brown by this time had become so interested in all that Lumsden did to improve his business that he never refused an invitation to discuss new possibilities.



The end of his holidays—and no fan in his office

"Brown," said Lumsden, "the winter is over and the worm weather will soon be here. It is time I began to think of a fan campaign. Have you any suggestions to offer "

"Say, Lumsden what do you take me for, a bureau of advice?"

"Sure! As a matter of fact you have been promoted to 'Special Adviser to the store of A. L. Lumsden, Electrical Dealer of 124 Fairview.' What do you think of the job and the title which goes with it?"

"Why the title is fine, but I don't know about the job. However, if I am to take it as a compliment then its O. K. A compliment to me is like petting to a cat, it makes me purr."

"Well as long as you purr to some purr-pose I don't mind."

"You will mind if you come across with any more of your beastly puns."

"Seriously though what would you suggest?"

"First of all, what have you planned in the way of advertising?"

"My plans are not elaborate. I intend to advertise widely in the newspapers of course, also to have a series of four special window displays, each display running for one week. Then, too, I had thought of having a large cheap working model made, of an electric fan, and fitted to the top of the delivery van. This will be kept in motion by the rush of air when the car is travelling. When it is standing by the curb the fan will be stationary unless there should happen to be a strong wind blowing. The blades of the fan I shall use as an advertisement by having a short pointed sentence painted on each, informing the public of the good points of the 'Cool-em' fan. The van sides, of course, would also be covered with the ads. your firm sent me. One other idea I have in mind which I think I will carry out if I have the time, is to have a large electric sign made. It will be in the shape of a hexagon or octogon about fifteen inches in diameter, and five feet long. It will be made of frosted glass on which I would have painted several maxims such as 'Don't perspire when you can keep cool just as easy.' The sign would revolve and each maxim would be illuminated in turn by lamps on the inside."

"If you ask me I think you have worked out an advertising campaign which will be effective in itself. I wouldn't think anymore of a selling stunt, be satisfied with what you have described and if you can think of anything more in the way of legitimate advertising within range of your purse, do it. I have one suggestion which may help. Several dealers that I know of sold a large number of heaters during the winter by placing one in the doorway and connecting it up so that the people passing could feel the heat. Why not carry out the same idea with a fan. Nothing like letting people have an actual experience with the facts of the goods you are selling."

"That is a good idea and I will sure carry it out. Now help me out with suggestions for window display. I am willing to spend freely for anything that will help to enlarge the sales. It may be considered by some a speculation but I don't think so, I believe the returns are too certain to be considered in the light of speculation."

"You are right Lumsden, if only for the fact that the electric fan has ceased to be considered a luxury and is now bought for its utility. Our firm has decided to feature the electric fan this season for all they are worth. As you know they have spent large sums of money in bringing the 'Cool-em' fan before the public, so that you have had the way paved for you already to some extent. Knowing this, I have been thinking over window displays in particular and can give you a few ideas which I don't think will cost you very much to put into execution. You will need, however, the use of several lay figures, some of which we can supply."

"I will have no difficulty in getting other figures if necessary. Andrew's brother is quite an artist, in fact he is employed by an advertising agency. Andrews is keen on window dressing and has often had his brother help him out in just such matters."

"That is good then. The first window I would suggest is: A room, or piazza screened, and with plants. Sitting in a chair a man reading a letter and laughing quietly. Near him a fan working and with one of the plants near enough to catch the breeze so that the leaves are gently moving. A card prominently placed should bear the message: 'Wifey writes from the seaside that instead of cool breezes she is getting hot ones.' Another card states that 'Business keeps hubby at home and the fan does the rest.'

"The second window I would suggest, should display a lady mending her children's clothes. Scattered about the room have several toys. A toy balloon fastened to the back of a chair should be within reach of the draught from a fan which cools the room, and thus be, floating about within the limit of the string. Place a show card in the window bearing the advice to ladies who gaze into the store that 'Mending for the children in the summer heat becomes a burden, why not turn it into a pleasure by using a 'Cool-em' fan?'

"The third window I would suggest should represent a Kitchen in which a lady is cooking. She should look cool and happy because of the fan which operates above her head. Place the fan high to point out the fact that heat from the stove rises and is thus driven towards the open door by the whirring fan, besides creating a cool breeze in the kitchen. A card should bear the simple message: 'The first room in the home which should have a 'Cool-em' fan.'

"The last of the four windows I would dress up as a bedroom. In the bed place a figure of a child. On a table at the foot of the bad arrange a fan in motion. Some article of clothing should be thrown negligently over the bed rail so that they will catch the breeze from the fan and wave occasionally. A card this time should advise the passers-by to: 'Buy a 'Cool-em' fan for the bedroom and prevent impure air from gathering in the room. By this means you will rise in the morning without that feeling of lethargy which has so often troubled you.' Another card might bear the message 'Bright and cheerful in the morning is our slogan.'

"In every window display I would place an almanac of the kind suitable for the room you are displaying. Let them show the months of, June, July, August, and September, respectively. This will suggest to people the especially hot months of the year and what is ahead of them if they do not provide themselves with some means of 'cooling.'

"In prominent places you might place cards with other pointed statements such as 'You cannot dress in a bathing suit when visitors call, neither can they, so give them and yourself comfort by using a 'Cool-em' fan.' The main idea is to make people realize their need of fans. Make your advertising matter so hot that those who read and see it will perspire with the very thoughts of summer heat."

"Brown, I admire you the more I know of you. I'm going to have Andrews talk with you, and between you, I shall expect to have window displays that will attract so great a crowd that the policeman will have to take up a permanent position outside the store to keep the crowd from blocking the sidewalk."

"And we'll do it too you old ruffian," and with that Brown thumped Lumsden on the back and went out laughing.

Net Profits, the Item That Counts

By A. L. McCarthy*

One hears how many washing machines, flatirons, vacuum cleaners and stoves were sold this month or that year, but mention is never made whether 5 or 25% net profit was made while doing the business. One reads of 1000 cleaners sold here this month and 500 washing machines sold there last month, but profits, net profits, are what count. To sell 1000 cleaners is interesting in itself, yet to tie up $30,000 in accounts receivable and make only 5% net profit on the total volume of business is anything but interesting. We would much rather do one-half the business and make a net profit of 10% on the gross sales, or one-third the business and earn 15% net on the volume.

It is not the volume of business done that gets a dealer credit at the bank, but the dollars and cents net profit he can make his business earn.

The "cost of doing business," the margin of profit in dollars and cents realized by the retail dealer in his sale of an appliance, together with the volume of business done, are the three factors that determine the amount of the net profit that will be earned.

Experience with electrical stores, together with knowledge of the general appliance business, has shown that a retail dealer sustains an expense in operating his business of 21 to 27% of his total sales. In other words, to do a retail business of $100,000 a year in electric appliances will necessitate the expenditure of approximately $25,000, covering salaries, commissions, advertising, freight, office, delivery and other expenses.

Net Profits in Their Relation to Discount

Using 25% as a basis for the cost of operation, some interesting data as regards net profits in their relation to discounts can be had by taking a concrete example. Assume that two appliances (one sold as easily as the other) bore list or user prices of $50 and $75, respectively, and were sold at retail accordingly. To bring in the point of discounts, assume the $50 article was bought in quantity or on contract at a discount of 40% off, or at $30, giving the retail merchant $20 gross profit, while the $75 article was bought at a discount of one-third off, or $50, giving the dealer a gross profit of $25.

The average salesman—yes, the average department manager, too—readily assumes that because the $75 article yields a gross profit of $25 its sale should be pushed ahead of the $50 article that yields only $20 gross profit. That they think this way is due primarily to the fact that they have forgotten that it coss 25% to conduct the business—that it costs approximately 25% to sell either.

It is to be noted that to sell the $50 article a selling expense of $12.50 would have to be deducted from the gross profit of $20, leaving the dealer a net profit of $7.50, while in the sale of the $75 article the selling expense would amount to $18.75, giving the dealer a net profit of $6.25. The analysis on this basis—which is fair to say the least—shows that the dealer earns $7.50 net on the $50 article and only $6.25 on the $75 article.

If the $50 article is desirable, readily sold, reliable merchandise, the dealer had better push the sale of it ahead of the $75 article. In so doing, he ties up less money in stock, less money in accounts receivable when sales are made on the deferred payment or charge basis. He gets 15% net on his gross sales on the $50 article and about 8% on the sales of the $75 article.

This analysis can be carried even further. It would be necessary for the retail dealer to do a business of $42,000 a year on the $75 appliance to earn in actual dollars and cents as much net profit as he realizes on a business of $25,000 on the $50 appliance. In other words, during the year he would have to sell 600 of the $75 article to earn the same net profit as realized on the sale of the $50 article.

---

*Eureka Vacuum Cleaner Co., in Electrical Review.

From an investment standpoint the dealer ties up 40% more money in stock when purchasing the $75 appliance for $50 than in purchasing the $50 appliance at $30, and 33% more money in accounts receivable in the sale of the respective appliance on deferred payments. In other words, it would require 73% more money to finance a going business of the $75 appliance than on the $50 one—and yet, on the same number of sales, less money in actual dollars and cents net profit would be earned.

Therefore, if the appliances are of the same nature, designed to accomplish the same results, it is most important that the retail dealer instruct his sales force to push the $50 appliance—providing, of course, it is a satisfactory piece of merchandise not only from his own point of view but also from the consumer's.

This analysis shows that the largest volume of business in dollars and cents does not necessarily mean that correspondingly large net profits will be earned. It also shows the effect of the cost of doing business on the net profit even though the gross margin of profit in dollars and cents is larger on one appliance than on another, list prices varying also. It is very essential that the dealer ascertain what the relation is between his gross sales for the month or year and the gross expense incurred during his operation for the month or year. The difference between the gross profit and the gross selling expense will always equal the net profit whether it is figured in dollars and cents or whether it is figured in percentages.

Buy right—cut the unnecessary expenses—stop the leaks—spend money when the spending will represent a reasonable per cent. of the business that will be secured—and sell right.

Selling a Vacuum Cleaner to "Skinflint" Johnson

There was only one customer whom I hated to see come into the store and that was Silas Johnson; 'Skinflint' Johnson most people called him, and the name fitted him to a 'T'. He had plenty of money but he did hate to part with any of it. His business was that of money lending and it was 'God help the poor blighter' who once got into his clutches. So mean was he that if he came into the store to make a purchase—and you can bet your boots it was something he simply had to have—he would look over the article very carefully and if he saw the faintest scratch or mar on his purchase he would try to get a discount. The result was that when the fellows saw him entering the store they would all be taken with a sudden enthusiasm for cleaning the showcases, or the shelves or some such job. I must confess myself equally guilty at times but being in charge of the store I could not very well pull off this stunt as often as the others.

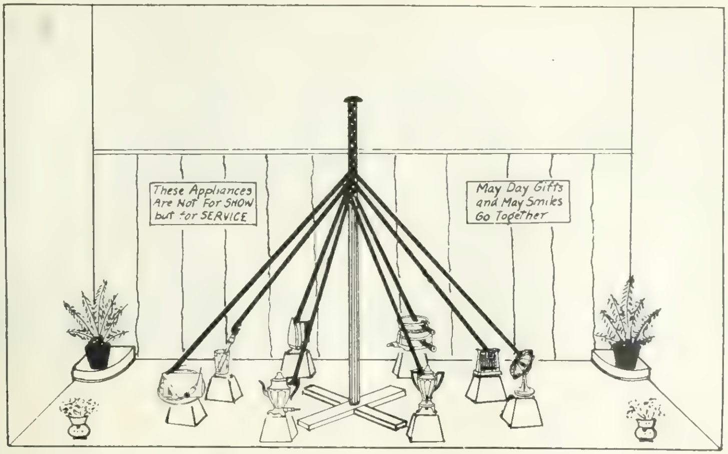
One day we were all discussing the old man and airing our grievances about him, when Selby, the latest addition to our sales staff, asked what was the largest sale we had ever made to Johnson. I, as the oldest salesman there, said that as far as I knew ten dollars was the largest sum at one time, and that was when a careless servant smashed the fixtures in the living room, with a step-ladder. The servant got the sack and Johnson bought the cheapest set of fixtures he could find in the store. I heard afterwards that he had tried to buy some second-hand fixtures before coming to us. He was too mean to have us put them up for him, but somehow managed to fix them himself. Selby said "He certainly takes the biscuit when it comes to keeping hold of cash. I'll tell you what I'll do Bell," he said turning to me, "I'll buy you the best hat in town if you can separate 'skinflint' from sixty dollars, for one of our vacuum cleaners." I felt that this was a direct challenge to my selling ability, and so after a few minutes thought accepted the offer.

To make a long story short, I won the hat, but it took me three months to do it. I thought the matter over very carefully and mapped out a plan of campaign, the principle of which was to make no apparent attempt to sell to him. First of all, I waited until he came to the store again. After serving him I very casually took hold of a vacuum cleaner and remarked that it was a rather pretty toy, at the same time asking him if he had ever seen one work. He said he had not, so I connected it up and showed him what it would do. He seemed interested, or at least curious, but I made no suggestion as to his buying one. After he was gone, I put on my hat and went myself to deliver the goods he had bought. This was to give me the chance to speak to his daughter, whom I had learned was the only person who could persuade him into spending money. I found that for some time they had been without a servant, and she was running the home herself. I talked to her about the cleaner and persuaded her to come to the store and see the machine demonstrated. She came, and was charmed with it, but said that she did not think her father would spend so much money as was required for the cleaner. I talked with her some more, and finally she consented to try and persuade him to get one. My next move was to send a little pamphlet which described very briefly the good points of the cleaner, and why every home should have one, to 'Skinflint's office. I also sent some literature to Miss Johnson for her further consideration. Then I awaited results.

We celebrate the Johnson Victory

Some two or three weeks later Johnson came into the store for some bulbs, and I noticed him looking intently at a cleaner. I remarked casually that I thought he ought to have one for his home. He did not say yes or no, but asked me to demonstrate one for him. I took him into the room at the back of the store which we used for such purposes, and showed him everything that the cleaner would do, and in particular pointed out that it would save him money in the longrun, by explaining that he would not have to hire so much help for the spring cleaning, as the use of a vacuum would prevent the accumulation of as much dirt as under the old method. I finished up by saying that it would mean far less work for his daughter. This seemed to touch him for he really did care for her. When he left the store I rang up Miss Johnson and told her of his visit, and urged her to keep after him about the cleaner. I assured her that in time we would win out. Evidently she did, with good effect, for a few days later he came into the store again and ordered one to be sent to the house, for his daughter's birthday he said. Incidently I had urged her to remind him of that event.

Selby gave me the hat, and I gave him a dinner to celebrate the victory.


These Appliances Are Not For SHOW but for SERVICE
May Day Gifts and May Smiles Go Together

Suggestion for a May Day Window. The underlying idea is to connect, in the mind of the passerby, the two ideas of "electrical appliances" and a "joyous spring day." A window that is very easy to get up.

A May Day Window Display

The chief significance of May Day is that it reminds us the bad weather of the winter and early spring is really behind us, and that the beauties and warmth of the summer time is ahead. It is the turning point of the two main seasons. Years ago it was a day much more thought of than at present. It was a day of mirth, and the Maypole played a prominent part in the pleasures of the day. The window display in the sketch, with its use of the Maypole, will be attractive because it will serve to remind many of the passers-by of the good times of the past.

It will be found to be a very inexpensive display, too, although, for those who have plenty of money to spend on such advertising, it can be made more attractive by the use of more expensive material. For the small dealer, however, paper ribbons on the pole will be very effective, and for the stands, boxes all of the same size, can be used. It will be found to be much more attractive if cheese cloth is used to cover the boxes and floor of the window rather than tissue paper. This should be of a green as near the shade of grass as possible. The plants in the background should also be on stands, but the flower vases do not need them. A better effect would be gained if small logs with the bark still intact, were used as stands. Two cards not too prominently placed, should bear pointed references to the value of electric appliances.

Never Fool A Customer

One of the biggest mistakes a contractor can make is to think that he can fool a customer and get away with it. He may for a time, but sooner or later that customer will find that he has been fooled and then "good-bye" to any further custom or recommendations from him. Solomon wrote "Cast thy breed upon the waters, for thou shalt find it after many days." True the writer referred to good deeds, but it is a law of human nature that deeds evilly done will also return. There is only one true road to success and that is to work up a reputation that will stand the test of the severest kind. The writer once heard a contractor dealer say "I am no salesman but what I lack in salesmanship I more than make up in having gained the confidence of my customers." A dealer who can say that, with the confidence born of certainty, has won a reputation to be envied, and need not worry about ending his days in the poorhouse.

Some time ago a lady found that the electric bells in her home were out of order. At first it was thought that new batteries were needed, but the installation of new batteries did not cause the bells to ring. Without further investigation the electrician decided that the wiring was at fault. He tore down the wires and replaced them by new. Incidentally he sent in a large bill. Just about this time a friend of the lady called to see her and was kept waiting at the door for some time on account of the failure of the bells to work. After he had been admitted his friend apologized for his having to wait and explained the cause. Having a little knowledge of electric bells he offered to try and remedy the defect, and proceeded at once to examine the bell itself. He found that the armature was corroded and thus prevented a proper functioning of the bell. It was no credit to the dealer that it was left to an amateur to find in a few minutes what he, a professional, had failed to find in several days. Either he was hoaxing the public, when he claimed to be an electrician, or he was deliberately making money at the expense of a customer's ignorance of things electrical. Such methods are to be deplored, they neither bring credit to the dealer, nor to the trade.

Organization for the Great Vancouver Meeting is Going Rapidly Ahead

No trouble is being spared to make the coming Electrical Meeting at Vancouver, B.C., on May 31st and June 1st an even greater success than that held last year

The headquarters will be in the spacious Vancouver Hotel, and reservations are already being made.

The Organization Committee consists of J. F. Little, S. E. Jarvis, W. W. Fraser, E. E. Walker, with President E. Brettell and Secretary Hargreaves.

A request has been made by the Electric Club of Vancouver that the entertainment for the closing night of the meeting be left in the hands of the Executive Committee of that Club. The Organization Committee has acceded to this request and with the main banquet to be held on the first night, visitors may be assured of two lively nights with many interesting items during the daytime.

All electrical men in every branch of the industry are cordially invited—along with their wives.

Some Hints on How to Sell Electric Grills

One wide awake contractor-dealer, after wiring a house leaves a bright red tag on a fixture, which states "A Brown Grill may be attached here; cost to cook—only 3 cents an hour. Phone me for a trial—Main 00."

Very often the grill can be sold in company with the toaster or percolator, in a combination offer. In your window feature the different things the grill will do. Put a grill on a pedestal; run red tapes or ribbons from the different parts of the device to the window, on which is pasted a small card: "You can fry two eggs for one-tenth cent on this," or "Boil water here," or "Do your simple broiling here."

One dealer had a window in which he had some old cast ofl iron frying pans, boilers, etc. He showed a part of the grill, saying: "This grill does all the old 'spider' will do, in less time, with less fuss and muss;" on another part he had "Broil here easily and cheaply." A card in the window read: "A Smith's Grill fills the bill for satisfaction—and lowers the bill for cooking."

Grills should be displayed in dust-proof cases where possible, but at the same time there should be samples on a table or counter where the customer can inspect them. Keep them shined up. Sell the original appliance from the case or counter, as you thus keep fresh, shining appliances in the case. Besides the customer likes to buy the one you have on display.

Hold an electrical luncheon, or tea, at which the guests can try their hand at cooking on the grill. Most people do not know all that you can do with a grill. Show them.

A dealer offered a prize of a grill to the little girl who would furnish the best 250-word essay on "What you can cook on the electric grill." Second and third prizes were also given. The finished essays were published and much publicity was secured.—Contractor-Dealer.

Do You Stock Goods Because You Like Them Personally—or Because They Will Appeal to Your Customers?

Do we really know our trade? From the standpoint of the buyer in a store, is not the purchasing of merchandise for the stock rather a matter of personal opinion than a true analysis of the customer's wants?

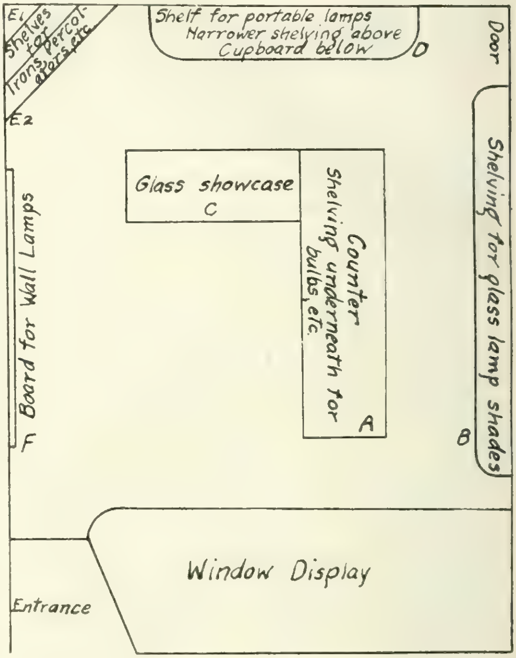
Some years ago I was in a New England city selling a line which was manufactured in two ways—one list of articles were machine made, the other list, while similar in character, were hand made. Both were of different yet very attractive appearance, of good quality, and intended for the same purpose. On the main street of this city were two stores, within one hundred yards of each other, handling seemingly the same merchandise. In the first store the buyer looking over the two lines remarked that they were both very attractive but his trade would not use the hand-made line and it was impossible for him to sell them. Consequently he did not stock any but did buy the machine made. Leaving this store and showing the samples in the store further up the street, the buyer here went into ectasies over the beauty of the hand-made line saying it was just the thing their trade would use, and immediately proceeded to stock very liberally of the hand-made product.

The following year in covering the same territory I found both dealers had sold their respective lines and were ready to place orders for more. As a matter of experiment, I suggested that they alternate, or at least divide between the two lines, and succeeded in selling each store some of both. The next year, the result was the same, both stores had sold out.

There is no question, in my mind, but that the trade of the two stores was identical as far as the type of people who patronized them was concerned. After this conclusive evidence I am fully convinced both buyers bought what pleased them, rather than as they each claimed, with a true knowledge of their trade. Knowing of other examples I am sure buyers purchase new lines mainly for two reasons—the line pleases them individually; secondly—there may have been a good salesman back of the line.—Benjamin Soby in "Contact."

A Suggested Layout For a Small Store

One of the problems of the contractor dealer who has only limited store space is the best way to lay out the store. The accompanying sketch is a suggestion for the layout of a store 14 ft. wide and 18 ft. deep, with window space 4 ft. from back to front. The following measurements will give some idea of the sizes of equipment used and their position in the store::

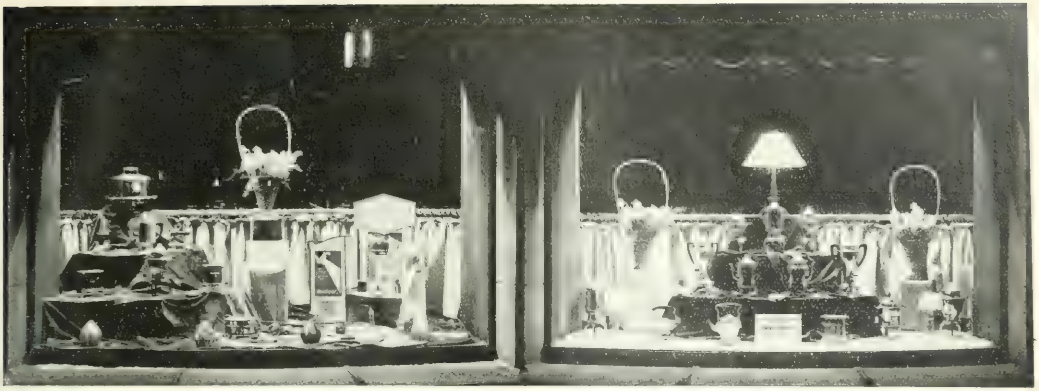


Suggested plan for a small store

A—8 ft. x 2 ft. 6 in.
B—10 ft. x 1 ft.
C—5 ft. x 2 ft.
D—7 ft.6 in. x 1 ft. 6 in.
E 1 to E 2—3 ft.
F—8 ft.
A to window display—2 ft.
A to B—2 ft. 6 in.
A to D—2 ft. 6 in.

This leaves a floor space for customers of about 8 ft. square. If large appliances, such as washing machines are to be sold, shelving "E" might be omitted to make place for a washer, with an attachment ready to demonstrate when necessary.

The Canadian General Electric Co., Ltd., have been awarded the contract for two 30 h.p. motors by the Woodstock City Council, Woodstock, Ont.



A very attractive double window display at the Toronto Hydro Carlaw Ave Store

Toronto Hydro Carlaw Avenue Store

The Gerrard St. store of the Toronto Hydro-electric System is both attractive and inexpensive. It shows good taste and decorative skill and cannot fail to be the means of making sales. The steadily growing use of flowers and plants as an aid to display is used with good effect, in both windows. Plush draperies also aid in the color effect. Each window represents a different style of display. The right-hand window shows the main attraction in the centre, displaying percolators. The remainder of the window is given over to a suggestion of toasters, tea kettles, samovars, and electric candlesticks. The left-hand window has a corner display and is not confined to one type of appliance. Flash lights are featured even though the main decoration has been given to the appliances. This is a suggestion of contrasts. Windows of this type call for a little time spent in planning and decorating but are well worth the time taken. These are curved windows and photographed separately, the doorway which stands between the windows, not being shown.

Month Meeting Toronto Contractors

The April meeting of the Toronto Association of Electrical Contractors was held in the Board of Trade rooms on Thursday evening, the 1st. As already announced, the matter of attendance had been left with the jobbers and, in consequence, one of the largest meetings in the history of the association was held. Mr. K. A. McIntyre, president of the association was in the chair. Brief addresses were made by Mr. M. W. Andrew, the retiring secretary; Mr. Barber, of McDonald & Willson; Mr. Edgar, Canadian General Electric Co.; Mr. Langmuir, Factory Products; Mr. McLean, Masco Company; Mr. Pierce, Central Electric Company; Mr. Stiles, Toronto District Sales Manager, Northern Electric Company; Mr. Martin Nealon; Mr. Drury and others.

Putting Your Customer on Your Sales Staff

An enthusiastic contractor-dealer recently conceived the plan of making use of his customers to sell more appliances. He believed that if offered sufficient inducement many owners of an electric washer, for instance, would be willing to demonstrate the washers to friends and neighbors, and thus increase the sale of washers. The obvious value of such a scheme is that the dealer adopting it, is able to set to work a number of salespeople, whom he could not afford to place on his regular payroll. Another point is that to see the machine in actual use by an enthusiastic owner carries far more weight with those watching than any store demonstration. Most ladies wish to be convinced that new methods are all that they are advertised to be before they will consider buying, and they cannot fail to be convinced by such a demonstration as has been described. The writer was told by one lady who owns an electric washer, that she washes for eight people, three of whom are children, and one hour after beginning the wash has, usually, only a few things left to hang out on the line to dry. During part of that hour she is able to go on with other work. Such a demonstration as this would save hours of salesman's talk. Another point is, that by this means of selling, the more washers sold the more salespeople the dealer would have. Naturally the scheme need not be confined to washers.

Enamelled Wire Manufactured in Canada

The Eugene F. Phillips Electrical Works Limited, Montreal, are adding an Enamelled Wire Plant to their factory, which they plan to have in operation by the end of next month. As the Phillips company are the pioneers in Canada for this class of wire, they are sparing no expense to ensure this product being up to the standard of quality which they have maintained in the wire and cable business for over thirty years.

Rapid Increase in Business

J. H. Edmunds & Company, electrical fixture manufacturers, 225-227 Richmond St. W., Toronto, who moved into their new premises in November last year, state that for the last three months their business has shown a very remarkable increase. In December this increase was 59 per cent. over the same month a year ago; in January, it was 56 per cent. and in February, 96 per cent. During the month of February the firm launched an advertising campaign, principally in connection with their lighting units the "Britelite" and "Edmundslite," and state that the results obtained are already beyond their highest expectations. Their new factory catalog is in course of preparation and will be ready for distribution in a very short time.

Diamond State Fibre Co. of Canada

The Diamond State Fibre Company of Canada, Limited, have for their Canadian address, 455 King St. W., Toronto. This company is now thoroughly organized for Canadian business and is operating at the above address. We are advised the Canadian corporation is separate and distinct from the American concern of similar name.

Dealers and Salesmen as Educators

The contractor-dealer and his salesmen must do more than stand behind the counter handing out the things customers ask for, taking orders, and generally going about the business of the store; they must become teachers as well. Many people have decided without investigation that electricity is a dangerous thing and only to be handled by the initiated. True, they have electric light in the house and have sense enough to realize its value, but that only depends upon the turning of a switch which they can do without fear. The handling of a vaccum cleaner or a washer is to them a totally different thing and at present many fear to introduce such things into their homes. If their minds do not run in that direction then perhaps they have got an exaggerated idea of the difficulty of working such appliances. To those who know, an electrical appliance is, of course, simplicity itself, nor is it in any way dangerous. It is the salesman's job to make this clear to prospective customers. To do this successfully a machine must be demonstrated. The value of such demonstrations is not only to show what a machine can do but to show how it can be done without trouble, or complications of anykind whatever; how the servants of the household, some of whom may not be too brilliant, can use them without any difficulty; and that with proper attention, which in itself is not difficult, the mechanism can be kept in good order as to rarely need attention from the repairer. Such little points as these should be driven home again and again. Keep them before the public. Remember that a lady knows what it means to wash by the old method and very quickly grasps the value of the new; but, what she wishes to be convinced of, is that the new washer will not always be going out of repair and that it is not dangerous. Once convinced of that she will not be very hard to sell to.

At the annual meeting of the Ontario Municipal Electrical Association held in Toronto recently, Mr. O. H. Scott, of Belleville, manager of the local hydro organization, was elected a vice-president, being nominated by the engineers' association.

A Hint Against Crowded Window Displays

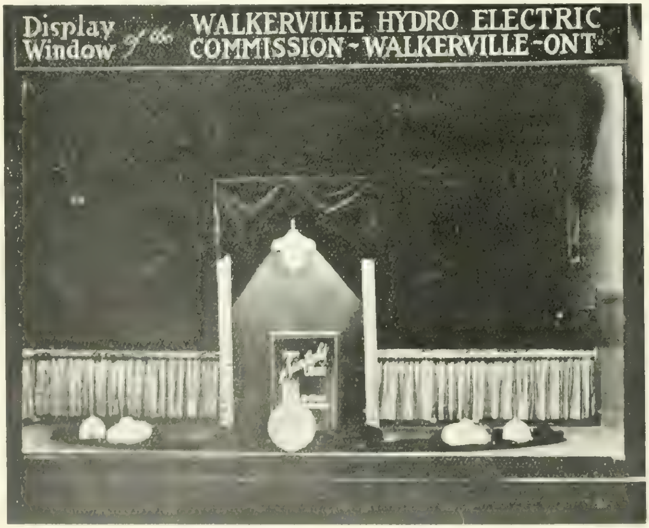
The salesman of a large manufacturing company called on a dealer in a small town who insisted upon putting a sample of every appliance he stocked, in the window. The salesman talked to this dealer time and again, urging him to concentrate on one or two particular devices. The merchant was stubborn but as a joke, some weeks later, when he knew the salesman was coming to town, placed one lonely electric iron in his window with a sign reading 'This is an electric iron.' Much to the dealer's surprise he sold more electric irons in that one day than he had in the previous month and he immediately gave the salesman an order for three dozen irons. This is a striking example of the result that can be produced by concentrating on one particular device

Display Your Goods

Buying goods and putting them on the shelf without any display will not sell them. An electrical dealer bought a quantity of electric bulbs of a now well known make. He made no display of them with the result that three weeks went by without a single sale. It was suggested to him that he make a window display of the bulbs. He did so with the result that he sold fourteen the first day. This surely justifies the trouble it takes to dress a window. People must see things before they know what to buy. If the goods are new and unusual it is necessary to do more than show the goods. They must be shown in a way which will educate the people to their particular value. Moreover they must be constantly thrust before the public eye and never allowed to be forgotten. Only by such means can the best results be obtained.

The Sunlight Electric Co.

The Sunlight Electric Company, sole distributors of the Sunlight Unit, who have been located in Detroit, will move on May 1st to Chicago. Their new offices will be located on the second floor of the Insurance Exchange Building, Jackson Blvd. & Wells.


Display Window of the WALKERVILLE HYDRO ELECTRIC COMMISSION - WALKERVILLE - ONT.

A very effective window display of "Sunlight" units put on by the Walkerville Hydro-Electric Commission. The unit is shown dismantled, assembled and "in action."

OFFICIAL CALL

Under the auspices of the Vancouver Association of Electrical Contractors and Dealers,

A Great Co-operation Meeting

will be held at Vancouver, B.C.,

May 31st and June 1st

The following, amongst others, will be present:

J. M. Wakeman, W. L. Goodwin, Samuel A. Chase, Harry Kirkland, W. H. Morton.

Come and welcome these "Co-operators."

ALL ELECTRICAL MEN ARE INVITED AND ALL MEETINGS WILL BE OPEN.

Vancouver Hotels are full; make your reservations early by writing President E. Brettell or Secretary R. H. Hargreaves, 422 Pacific Bldg., Vancouver, B.C.

Your wife is also cordially invited.
She will have a good time, too.

The Atlas Manufacturing Co.

The Atlas Manufacturing Company, a Port Arthur concern, 234 Cameron St., recently completed arrangements for the purchase of a good business site on Ambrose Street, immediately off Cumberland street. Upon this property is a warehouse, which will be made adaptable as a factory plant. The ground floor will be used as a machine shop and manufacturing plant and the upstairs for storage and offices. It is proposed to commence work at once on this work. The company was organized last fall, and is composed of Port Arthur young men, who have but recently received their charter. Among the articles being manufactured by the Atlas company are electric table lamps, electric bureau and floor lamps, and electrical call systems.

Some "Sew Motor" Selling Points

An electric appliance which is rapidly coming into favor with the ladies is the electric sewing machine. Most ladies, who have used a treadle machine, complain of the physical harm received from constant use of the treadle, and the awkwardness of the sewing machine without a treadle. Both of the difficulties have disappeared with the advent of the electric sewing machine. Again, many ladies have been in the habit of sending out their sewing because of the nuisance of working the machine. This is no longer necessary because the motor does away with the nuisance. If the dealer, therefore, is anxious to sell his machines he will make these points clear and pound away at these arguments on every possible occasion. Probably his prospective customer will make use of the argument that she already has a machine of the old type and can't afford to buy another. The answer, of course, is that a motor can be fitted to the old machine which will give her every satisfaction. Obviously the dealer must consider every possible argument likely to be used by a 'prospect' and be ready with an answer.

One good way of advertising the electric sewing machine would be for the dealer to loan one for a day to some 'Ladies Aid' or other church organization where sewing is one of the chief functions. They will only be too glad to make use of it, for as a rule they have no machine in the society, and the members are called upon to loan there own machines, also going to the trouble of having it carted to and from the church each time the society meets. A loan, to such a society, by a dealer, of an electrically driven machine would be a demonstration of a kind he would find it almost impossible to duplicate in any other way, and it would be strange indeed, if within the next few days following, he did not have enquiries concerning the cost of the machine, from members present at the meeting. Where such a loan is made it would be as well to make a condition that the name and address of every lady at the meeting be handed to the dealer. To aid in this he might have a few cards printed on which this information could be given.

The main thing is to cause the value of the machine to be known, and to make it known to those who use sewing machines, that electrically driven machines are the last word in efficiency, and save both time and health.

A Few Do's For the Contractor Dealer

If you are like the majority of people you have been inundated with 'don'ts' from your childhood up; here are a few 'do's' for a change. Do you:

1. Keep an inventory of your stock, so that you know exactly what you have got.
2. So arrange your stock on the shelves that new stuff coming in is placed at the back, and thus you are always handing out the older stock first.
3. Move your display goods round every week or two, so that customers returning to the store will realize that you are alive to the value of not tiring customers by the continued sameness of your interior display. This refers also to window displays.
4. Keep your window clean, dust the counter, showcases, and articles for sale, and in all such ways give the impression that you are keen to make yours the most attractive store in the town.
5. Get right after business instead of sitting behind your desk, or standing behind the counter waiting for customers to enter the store and offer you work.
6. Feature your goods by newspaper advertising, circulars, electric signs and the many ways of bringing your stock before the public.
7. Stand behind the articles you sell, and give every satisfaction to customers having complaints.
8. Use your telephone to the fullest extent to get in touch with prospective customers.
9. Keep one or two chairs, or a seat in the store, and thus help to make shopping less tiring to your customers.
10. In short, do you put 'pep' into all that you do; encourage your employees to do the same, and thus make your customers believe that you are in business for their benefit as well as your own.

Help Your Burglar

The most progressive and up-to-date burglars are using electric drills for their best safe work, attaching the device to the nearest lamp socket. If you are planning a new office be sure to provide proper facilities for electric safe blowing and be in line with the most modern practice. Also, if you are building a house, provide plenty of baseboard and wall outlets. Even if burglars don't visit you, you'll find them handy to attach toasters, irons, vacuum cleaners and other electrical devices to.—B. C. Buzzer.

The Canadian Comstock company has received the contract for the complete electrical and mechanical equipment of the pulp and paper mill of the St. Maurice Lumber Company at Three Rivers, Quebec, which is being built at a cost of $6,500,000. The contract embraces the furnishing and installing of motors, transformers, electrical feeders and distribution, high pressure, steam heating, sprinkler and plumbing systems. The work is now in progress.

A "Suggestion" Window Display

Much is being said and written these days about the power of suggestion. It is used by doctors, to aid in curing certain mental diseases. It is also the basic principle of the famous "Third Degree". But to electrical dealers its greatest value is in the fact that it is the secret of good advertising.

The following is a suggestion for a window display, in which one class of articles is being advertised and another article suggested; without detracting the least from the main subject of display.

The window should represent a dining-room with table set for a meal. On the table place an electric tea urn, and a grill. Sitting at the table is a lady in her working dress. On a shelf should be a clock pointing to 12.30 p.m. In the background, through an arched entrance is seen part of another room, and placed negligently against a chair a suction sweeper. A card prominently placed should bear the words "Lunch on cleaning day."

Such a window would be set to display primarily the grill and tea urn; but a suggestion is made by the presence of the sweeper. A display of sweepers the following week would emphasize the suggestion.

Many people may be attracted to the window by the figure and the table appliances. They may possess all such but have no sweeper. The background suggestion may thus bear fruit.

Trade Notes

The Hayward Lumber Co., 11904 73rd St., Edmonton Alta., are receiving tenders for a new power house at their plant.

Mr. Fred Clow of Brockville, Ont., has been awarded the contract for electric work on the addition to the Pearl St. School, Brockville.

The Crown Electric Mfg. Co., Ltd., 17-21 Pearl St., Brantford, Ont., are making extensions to their electric fixture factory at a cost of $14,000.

Canada Electric Castings, Limited, is the name of a new firm just incorporated for the purpose of operating a foundry. The headquarters will be at Orillia, and the firm is capitalized at $40,000.

The Messrs. Vincent & Say Electric Co. have been awarded the contract for all electrical work on the extension to the office building of Belding Paul Corticelli Ltd., of 185 Shearer St., Montreal.

The Nova Scotia Power Commission has been authorized to proceed with the development of an 8,000 h.p. unit at Margarets Bay, about 20 miles from Halifax. K. H. Smith is the engineer in charge. C. H. & P. H. Mitchell, Toronto, are consulting engineers.

A new electric light and power company has been incorporated under the name of the Sudbury Hydro-electric Development Company, Limited, with headquarters at Sudbury, Ont. It is capitalized at $50,000.

MacGovern & Company, Limited, is a new firm incorporated with a capital stock of $350,000, with headquarters at Montreal, Que. They will carry on the business of manufacturers of electric apparatus of every kind.

"The electrical department of a large departmental store in Los Angeles, is charged $5 per day or approximately $140 per month for 8 ft. of window space." This is surely a high tribute to the value of window display.

The Eugene F. Phillips Electrical Works, Limited, Montreal have adopted the group insurance plan, under which every employee is insured for $2,000 in case of death or total disablement. This plan is being increasingly adopted, affording as it does a protection to the employee and his family.

The Volt Manufacturing Co., Ltd., with headquarters at Welland, Ont., has been acquired as a going concern by a new company, and will continue to manufacture all kinds of electrical machinery. The new company will retain the business name of the former company.

A new firm to be known as The Hubbell Manufacturing Company, Limited, with headquarters at Toronto, has been incorporated for the manufacture of all kinds of electrical heating and lighting devices. This firm is capitalized at $40,000, and is under the provisional directorate of Messrs. G. P. McHugh, Max Herlick and F. W. Kemp, all of the city of Toronto.

Four new companies have been incorporated in Ontario recently. There names are:

Name	H.O.	Capital
Desboro Telephone Co., Ltd.,	Desboro	$10,000
Spring Creek Telephone Co., Ltd.,	Woodstock	630
Victory Telephone Co., Ltd.,	Chesley	8,400
Ingleside Telephone Co., Ltd.	Beaconsfield	1,500

On Wednesday evening, March 24th, the staff of the Inspection Department, Toronto Hydro-electric System, gathered at their Club House, 30 Murray Street, when Mr. G. W. Leach was the recipient of a handsome gold watch as a token of appreciation of his nine years' service as electric power inspector. Mr. Leach resigned March 1st, and has since joined the staff of Mr. J. Everard Myers, electrical engineer and contractor, as construction manager.

Mersrs. Dave and Daws Reid have recently opened an electrical store, for contracting, fixtures and supplies at Seaforth, Ont. Mr. Dave Reid went overseas during 1915 with the Canadian Engineers, afterwards transferring to the Royal Naval Air Service, and returned to Canada in 1919. Previously he was employed with the London Hydro-electric. Mr. Daws Reid went overseas during 1916 with the 161st Batt., afterwards transferring to the Canadian Army Medical Corps, and returned to Canada in 1919.

The Packard Electric Co. Ltd., have recently opened a district office in Toronto at 401 Temple Bldg., with Mr. C. W. Spratt in charge. Tel. Main 6961. They have also a District office in Montreal, at 725 Power Building, with Mr. V. J. O'Donnell in charge. Telephone Main 7636. Mr. Geo. C. Rough, president of the company, reports a very great demand for Packard transformers and meters, the present volume of business secured being the largest in the history of the company, and the prospects for future business never having looked brighter.

A New "Daylight" Lamp

It is reported that a light has been perfected in Great Britain which far surpasses any existing arrangement of artificial light, and is the closest approximation to actual daylight ever accomplished. The apparatus consists of a high-power electric light bulb, fitted with a cup-shaped opaque reflector, the silvered inner side of which reflects the light against a parasol-shaped screen placed above the light. The screen is lined with small patches of different colors, arranged according to a formula worked out empirically by the inventor, and carefully tested and perfected. The light thrown down from the screen is said to show colors almost as well as in full daylight. A test was made with such articles as colored wools, Chinese enamels, pastels and color prints, each being subjected successively to daylight, ordinary electric light and the new light. Under the new light delicate yellows were quite distinct, indigo blues were blue, cobalts had their full value, and violets lost the reddish shade which they display in electric light.

Current News and Notes

Fredericton, N. B.

It is stated that the International Paper Company has decided not to proceed with its power development at Grand Falls owing to the high costs of labor and materials.

Halifax, N. S.

Mr. J. R. Mackenzie, Roy Building, Halifax, N. S., has been awarded the contract for the Richmond Paper Co's. new factory and will receive tenders for the electrical work.

Plans will be called about May 1st for the electrical work on the new church at the corner of Quinpool Rd. and Oxford St., Halifax, N. S. Architect, Leslie R. L. Fairn, Aylesford, N. S.

Messrs. Moirs Ltd., Argyle St., Halifax, N. S., will purchase all electrical fixtures and supplies, for their new factory and paper box mill at Bedford, N. S.

Hamilton, Ont.

The Hydro department is offering a reward of $100 for the arrest and conviction of a person who has been destroying insulators on high tension lines east of the city of Hamilton. On Friday, March 19th, the power failed owing to line trouble. It was discovered that a vandal with a rifle had been potting at the insulators, many of which he had broken, and that one bullet had almost severed a high tension wire. This broke in a heavy wind. The result was that a large part of the city was in darkness and hundreds of men in east end factories were out of employment for half a day.

Hamilton, Ont.

Mr. G. Y. Smith, Beulah Court, Hamilton, is having stores and apartments erected to cost $50,000. He will sublet the electrical work.

Hull, Que.

The owners of the Hull Iron & Steel Works, manager Mr. A. H. Coplan, are having plans prepared for a new foundry. Contracts will be called later for electrical work including electric heating.

Ingersoll, Ont.

The contract for the electrical work of the new school shortly to be erected at Ingersoll, Ont., is still to be let. The architect is Mr. W. G. Murray, Dominion Savings Building, London, Ont.

Kitchener, Ont.

Mr. John Schultz, Central Hotel, Kitchener, general contractor for the new departmental store on 220 King St. W., Kitchener, is open to purchase electrical supplies and fittings.

Levis, Que.

The Knights of Columbus at Levis, Que., are making alterations and additions to their Deziel St. Club building, at a cost of $30,000. They are in the market to buy electric fixtures and fittings. Appy to J. L. Roberge, St. Etienne St., Levis, Que.

Leamington, Ont.

Plans are being prepared for a new school at Leamington, Ont. The building is estimated to cost $100,000. Tenders for electric fixtures, etc., will be called for later. The architect is Mr. J. C. Pennington, La Belle Building, Windsor, Ont.

London, Ont.

The Ontario Railway Board has been asked to enforce service on the London Street Railway and will take up the matter immediately. This has resulted from the Street Railway Company reducing materially the service on all lines, in retaliation for the refusal of the citizens to grant higher fares.

The erection of a factory at London, Ont., for the manufacture of equipment, is said to be under consideration by the Hydro-electric power commission of Ont.

Markham, Ont.

Hydro power was turned on for the first time in Markham, Ont., on Saturday, April 3rd.

Montreal, Que.

The Federal Construction Co., Ltd., 329 Ontario St. E., Montreal, will build 6 residences at a cost of $15,000 each on St. Antoine Rd., and are open to buy electric fixtures and supplies. Also for 30 residences at $12,000 each on Northcliffe Ave.

Electric fixtures and supplies are wanted by Mr. A. Payne, 168 Lacrasse St., Montreal, for 2 residences and garage which he is building at a cost of $13,500 each on Wolseley Ave., Montreal.

Tenders for electrical work on 17 residences will be let by the owner, Mr. John H. Hand, 4865 Sherbrooke St. W., Montreal.

Alterations to stores amounting to $20,000 is being done at 156 St. James St., Montreal. The electric work will be sub-let by the general contractors, Messrs. Cook & Leich, 55 St. Francois Xavier St.

The Anglin-Norcross Co., Ltd., have been awarded the contract by Bovril Ltd., for their new factory at the corner of Van Horne & Park Ave., Montreal, Que., and will sublet all electrical work including one electric freight elevator. Their address is 65 Victoria St., Montreal, Que.

The Dominion Government Harbor Commissioners are building a new cold storage plant and power house at the foot of Beaudry St., Harbor Front, Montreal. Tenders will be called shortly for electrical apparatus. The tender for electrical machinery has been let to the Canadian General Electric Co.

Messrs. Duquette & Patenaude, 339 St. Joseph Blvd., Montreal, are erecting an apartment house at a cost of $70,000. Tenders for electrical fixtures and wiring will be called for shortly.

The Canada Electric Co., 250 Beaver Hall Hill, Montreal, have been given the contract for electrical work connected with alterations to the Methodist Church, Hadley Street, Cite St. Paul, Montreal.

The Canadian Laco Lamps, Ltd., recently incorporated will take over the plant of the Dominion Lamp Company, Ltd., of Montreal.

Moosomin, Sask.

Tenders will be received by the town clerk of Moosomin, Sask., Mr. Geo. S. Page, until May 5th, for (a) internal combustion engines; (b) generators, excitor, switchboard, street lighting apparatus, transformers, meters, etc., (c) one oil storage tank; (d) pole, wire and line material; (e) erection of electric pole line and (f) power station and cooling chamber.

Nanaimo, B. C.

The Imperial Oil Company of Canada will shortly call for tenders for electrical work in their new warehouse which they are building in Nanaimo, B. C. The architect is the company's own engineer.

Niagara Falls, Ont.

The City Council of Niagara Falls, on April 1st, decided to take over the local line of the N. S. & T. Railway.

Ottawa, Ont.

Tenders are called for by the Dominion Government, Department of Public Works, for an electric passenger elevator car, and the necessary machinery. Plans and specifications at the office of the chief architect, Department of Public Works, Ottawa

The Ottawa Hydro-electric Commission are calling for tenders for electrical supplies and transformers. Tenders will be received by the general manager, Mr. J. E. Brown, at the offices of the commission, 75 Laurier Ave. W., Ottawa.

Mrs. R. Quain, 305 Wilbrod St., Ottawa, is in the market to buy electric lighting fixtures, and vacuum cleaner for her apartment house, alterations to which will cost $12,000.

The Marchand Electric Co., Bank National Bldg., Ottawa, have been given the contract for electrical work in the new synagogue, King Edward Ave., Ottawa.

Peterboro, Ont.

The Canadian Packing Co. are building an addition to their plant on George St., Peterboro. The contractors are Messrs Townsend Co., Harbor Commission Bldg., Toronto, and they will sub-let the electrical work.

It is announced that Peterboro's street railway will be equipped solely with cars of the one-man type. The entire fleet of wooden cars will be withdrawn and modern steel cars similar to those now used on Charlotte Street will be put into service. The local railway system is owned and operated by the Hydro-electric Commission of Ontario.

Canadian Woolens Ltd., Peterboro, are erecting a weave shed on Brown St. and a worsted mill and offices on the corner of Donneland and Cambridge Sts., both in Peterboro. They have let the contracts for electric lighting to Messrs. Miller, Power & Watson, Peterboro, and electric elevators to the Roelofson Elevator Co., Galt, Ont.

As the result of the ratepayers of Peterboro passing a by-law granting the Canadian General Electric Co., Ltd. certain concessions, this company have decided to add to their plant and equipment in Peterboro at a cost of $500,000

The Hydro-electric Commission's power transmission line from Healey Falls, Ont., to Peterboro, Ont., by way of Norwood and Havelock is nearing completion and from the present prospects should be ready to receive the "juice" by April 15th.

Quebec, Que.

Additions to the Seminary of Quebec, Holy Family St., Quebec, are being made at a cost of $300,000. The tenders for the electric work have not yet been let. Architects, Mr. J. S. Bergeron, 103 St. John St., Quebec.

Sarnia, Ont.

Tenders will be called shortly for electric wiring and fixtures, for the Technical and Collegiate School to be built on Wellington St., Sarnia, Ont. The architect is S. B. Coon & Son, 810 Excelsior Life Building, Toronto. The cost of the building will be approximately $350,000.

Sherbrooke, Que.

Mr. Alfred Dion, 51 Brooks St., Sherbrooke, Que., general contractor for the extensions to the Orphans' and Old People's Home, wants prices on electric freight and passenger elevators.

St. Catharines, Ont.

Nearly $500,000 will be spent this year in improvements to the Niagara, St. Catharines & Toronto Railway in the St. Catharines district ,according to an announcement by General Supt. E. W. Oliver. The plans include the erection of a new car shop on Welland Avenue, St. Catharines, at an expenditure of $50,000, the converting of all local line cars into modern pay-as-you-enter cars, and the increasing of the power sub-station facilities and centralizing of control

Sumas Lake, B. C.

The British Columbia Electric Railway will commence work at once on track improvements, at a cost of $100,000. These improvements will be in the neighborhood of Sumas Lake, B. C.

Sydney Mines, N. S.

The Northern Electric Co. have been awarded the contract for the installation of a fire alarm, by the town council of Sydney Mines, N. S.

Three Rivers, Que.

The contract for electrical work on four tenements on Denque St., Three Rivers, Que., has been let to Mr. J. B. Badeaux, 471 St. Maurice St., Three Rivers. Mr. Badeaux has also been awarded the contract for the electrical work on the new cold storage plant on Notre Dame St., Three Rivers.

Alterations are being carried out on the Knights of Columbus Club at Three Rivers, Que., and prices are wanted on electric lighting fixtures, and a vacuum cleaner. All communications should be addressed to Mr. J. N. Jourdain at the club.

Mr. R. Godin wants prices on electric stoves and fixtures for three tenements and two stores on Royale and St. Julie Sts., Three Rivers, Que.

Toronto, Ont.

Tenders will be called shortly for all electrical work on the new addition to the King Elward Hotel, King St., Toronto. The architects are Messrs. Watt & Blackwell, 79 Adelaide St., Toronto, Ont.

The Canadian General Electric Co., Ltd., have called for tenders for a new manufacturing plant at the corner of Wallace and Ward Aves., Toronto.

Tenders are invited by Mr. F. F. Saunders, 672 Crawford St., Toronto, for the electrical work on two duplex residences, to be erected on Rusholme Rd., Toronto.

Tenders are to be let for the electrical work on six stores and apartments to be erected on the corner of St. Clair and Crang Aves., Toronto.

The Dominion Electric Contracting Co., 330 Queen St West, Toronto, have been awarded the following contracts for the electrical work on stores and apartments. By Mr. Polumbo for work at 1112 St. Clair Ave.; by Mr. Polito for work at corner of St. Clair Ave. and Lauder Ave.; by Mr. J. Ciro for work at 1078-80-82 St. Clair Ave. W., Toronto.

Truro, N. S.

Mr. S. B. Gray, architect, Truro, N. S., wants prices on "Made in Canada" electric fixtures and equipment.

Vancouver, B. C.

Tenders are to be called for shortly by the Dominion Government, Department of Public Works, for electrical work on the new offices, barracks and stables, Shaughnessy Heights, Vancouver, B. C. For specifications, etc., apply architect Department of Public Works.

Windsor, Ont.

Windsor's street railway system was taken over by the Ontario Hydro-electric Commission on April 1st. Howard Brooker is general manager of the road, and Arthur McGill his assistant.

The Universal Car Agency, corner of Chatham and Pelessier Sts., Windsor, Ont., are having plans prepared for a garage to cost approximately $75,000. Tenders for electric fixtures and wiring will be called for later.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 309 Broadway
CHICAGO - - - 1413 Gt. Northern Bldg.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, May 1, 1920 No. 9

Contemplated Zonal Postal Rates Would Stifle Canada's Growth

It has come to our attention that the Postal Department of the Dominion Government is contemplating an increase in postal rates on Canadian business and technical newspapers. One of the suggestions is that the new rate should be zonal, i.e., increase with the distance from the point of publication, which would, in effect, place a prohibitory tax on anything beyond purely local distribution, and divide the Dominion into sections between which there would be no means of circulating news and information. This would affect us, as Canadians, in many ways. For example, it would, of course, make it quite impossible for Canadian publications of a national character to exist, and would result in the circulation of foreign publications in Canada, with a consequent increase in the sale of foreign goods, and a corresponding decrease in the demand for "Made in Canada" products.

Another evident example is the influence such a move would have on our immigrant population. Difficult as it now is to assimilate it, this difficulty would be many times greater in the absence of national literature. All our past hopes and ideals of a Canadian "nation" would go for naught. We would become merely an aggregation of groups.

For the Canadian publisher himself it may be said that he has received little encouragement and no protection in the past. All his raw materials are subject to heavy duty, in spite of which he has been forced to compete with foreign publications entering Canada duty free. In spite of this handicap our publishing houses are today covering the country from coast to coast, supporting our industries, urging the conservation of our national resources and the building up of an export trade—in a word, seeking to co-ordinate the various elements in this rich and rapidly developing country, so that we may become an appreciable factor in world history. Is it fair, or wise, to destroy this influence for good which has been built up at so great expense of capital and human energy.

Canada's Electric Imports Eleven Millions, Exports Two Millions

Canada during the fiscal year 1919 imported electric apparatus to the value of $11,005,753, of which no less than $10,887,657 came from the United States. Imports of American goods of this kind have more than doubled during the last five years. In 1915 they were $5,137,383. Imports of electric supplies from other countries during the past year were: Great Britain, $88,778; France, $2,803; Spain, $19,629; Sweden, $6,480. In January of the present year Canada imported $953,361 worth of electric and gas fixtures, of which $930,773 came from the United States.

Canada is also becoming quite an exporter of electrical apparatus. In 1915 these exports were valued at $97,870; in 1919 they were valued at $2,167,545.

Though the manufacturing of electrical apparatus is one of the newer of the Canadian industries, it is making satisfactory progress. The report of the Bureau of Statistics for 1918 shows that there were sixty-eight plants in operation throughout the Dominion, forty-two being in Ontario, thirteen in Quebec, seven in Manitoba, three in British Columbia, two in Alberta and one in Saskatchewan. The total capital investment for the Dominion was put at $43,285,405. The total investment is divided among the provinces as follows: Ontario, $26,426,129; Quebec, $16,525,454; Manitoba, $253,026; British Columbia, $42,881; Alberta, $19,736; Saskatchewan, $18,179. The number of employees is given as 8,862, while the salaries and wages paid during the year totalled $8,456,705.

The total selling value of all articles produced at the works in 1918 was $30,045,399, the value of the principal products being: Dynamos, generators and converters, $1,503,433; transformers, $2,291,874; switchboards, panels, etc., $990,898; motors, $2,727,673; storage batteries, $213,624; primary batteries, $1,397,635; incandescent lamps, $1,525,198; insulated wires and cables, $5,154,984; other electrical machinery, $1,738,085; carbons, $1,362,666; other miscellaneous products, $8,492,643.

Grounding of Transformers Practical and Efficient Safeguard

The recent Privy Council decision in the case of Vandry et al vs. The Quebec Railway, Light, Heat & Power Company, mentioned briefly elsewhere, upholding the previous decision of the Supreme Court of Canada which placed the blame on the company due largely to the fact that their transformer secondaries were not grounded, brings to the front once more the importance of this matter.

The defendants set up the claim that the wiring of their customers' house was defective and that the carrying out of the request to ground their secondaries would substitute new difficulties for the old. Their Lordships state, however, in the judgment, that it was not shown that the wiring of the house was defective to this extent, although it was "demode." They also state that the company could have inspected the wiring and if it was unsafe could have declined to supply current, and they further state: "they conclude that the grounding of the wiring of the transformers would, some substantial time before the action in question, have been a practical and efficient safeguard against the injury which in fact was inflicted."

The extent to which grounding may be adopted without creating hazards that counterbalance the advantages claimed for it is, of necessity, a somewhat indeterminate matter, and has provoked a great deal of discussion. Where it is established, however, that such grounding constitutes "a practical and efficient safeguard" there should be no delay in its installation.

In All Respects Ready for Trade

The "Work of the British Navy in the Mediterranean" was the subject of an interesting address by Captain Evan J. Edwards, His Majesty's Senior Trade Commissioner in Canada and Newfoundland, before the Montreal Weekly Electrical Luncheon on April 21st. Captain Edwards paid tribute to the work carried out by British sloops, destroyers, trawlers and drifters under the orders of Admiral Ferguson, British Admiral of patrols, both in escorting and in mine sweeping. He gave instances to show the courage and resource displayed under the most trying circumstances by officers and men of the navy and of the merchant service.

The speaker quoted the commencing phrase of the sailing orders which are issued to the senior officers; these words, which are traditional in the navy, are "Being in all respects ready for sea and to engage the enemy." Captain Edwards urged that these words be adopted by the business men of the British Empire today, whose slogan should be "Being in all respects ready for trade, and to keep that trade within the British Empire as far as possible."

In closing he made a strong appeal for still greater pride in the British Empire, and urged his hearers to do everything possible in trade, and in other ways to make this already mighty Empire still mightier.

An Electrically Operated Cafeteria

Experience with an electrically operated cafeteria in Louisville, Ky., indicates that it is turning out to be a money maker not only for the local central station but also for the proprietor. The restaurant is open from 7.30 a.m. to 9 p.m., serving three meals per day. It is operated on the self-service plan and is serving about 3,000 meals per day. According to its manager, the average customer's check is about 65 cents. This would show receipts of about $1,950 a day.

The electrical heating installation consists of the following equipment: Four hotel-type ranges, 22 kw. each; two bake ovens, 25 kw. and 5 kw. each; one griddle-cake baker, 6 kw., and one electric toaster, 3 kw., or a total of 149 kw.

This heating and baking equipment has shown an average monthly demand of about 100 kw., and an average monthly energy consumption of about 25,000 kw. h. Under these conditions the cafeteria earns an electric rate of about 1.8 cents per kw.h. on the electric cooking load. According to these figures the cafeteria owner pays the electric company about $450 a month for energy for electric cooking.

The original installation cost the cafeteria owner about $4,000. This first cost, however, does not include the cost of installation. The cafeteria owner is very well pleased with the installation, particularly in view of the fact that it enables him to use basement space for his kitchen without having to contend with disagreeable fumes such as arise from other fuels where the kitchen is in the basement. Hughes' equipment is used for cooking.

Hydro Developments in Manitoba

Rapid extension of hydro-electric power under the Manitoba Power Commission for the coming year was provided for by the provincial government recently, when an order-in-council was passed authorizing the expenditure of $516,500. This money is to be used for the following items:

"To tap the Portage la Prairie line at Oakville and run a line through Carman to Morden with lateral lines to Roland, Winkler and Manitou, the whole to cost $250,000.

"To tap the Portage line at High Bluff and run a line to Gladstone, to cost $150,000.

"To purchase a set of conductors and transformers for the Portage line, $90,000.

"To survey a route for a line from Winnipeg along the Red river valley to Emerson, to cost $1,500.

"To purchase a construction plant, including one earth-boring machine; two 2-ton trucks, two automobiles and other equipment, $25,000."

It was stated officially that this work would proceed as quickly as possible and an endeavor would be made to complete the programme before next winter.

St. Margaret's Bay Contracts

The Nova Scotia Power Commission met in Halifax on April 15th to consider tenders for general construction work, hydraulic and electrical equipment for the St. Margaret's Bay power development. Very satisfactory tenders were received for all work on which tenders were called, there being a particularly large number of good tenders for the general construction.

It was decided to award the contract for the electrical generators, four in all, to the Canadian General Electric Company and these machines will be manufactured in this company's shops at Peterboro, Ont. The contract for a quantity of wood-stave pipe 6 feet and 10 feet in diameter was awarded to the Pacific Coast Pipe Company, of Vancouver. About 200,000 lbs. of aluminum cable for transmission line purposes is to be supplied by the Northern Aluminum Company who manufacture at Shawinigan Falls, Que. It was decided to award the contract for the general construction work, this work involving the building of dams, powerhouses and intakes, the grading of pipe lines and other miscellaneous work, to Messrs. D. G. Loomis & Sons, general contractors, of Montreal. A number of attractive proposals for this work were received. Due to the fact that certain essential data had not yet been received from hydraulic manufacturers, a final award for the water-wheels could not be made although a tentative conclusion was reached.

The specifications for this work call for the completion of one generating station by January 1st, 1921, and the completion of the second generating station by June 1st, 1921. The total development at present under way is designed to deliver about 9,000 h.p. in Halifax.

Grand Falls Must be Developed

At a meeting of the Corporations Committee in the New Brunswick Legislature, Premier Foster recently stated that unless the International Paper Co. is prepared to go ahead with the immediate and complete development of their power interests at Grand Falls, St. John River, N. B., their rights will be expropriated by the government and turned over to the Fraser Paper Co. who are at present seeking to get permission to build a dam on the Tobique River.

The Delta-Star Electric Company, Chicago, Ill., are issuing Special Publication No. 92, describing a few forms of their Unit type high tension outdoor sub-stations.

Toronto Section of American Institute of Electrical Engineers Elects Officers—President Townley of Parent Institute Addresses the Section

At the annual meeting of the Toronto Section of the American Institute of Electrical Engineers, held in the Engineers' Club, the following officers were elected for the coming year: Chairman, Frank Ewart, of Ewart, Jacob & Byam; secretary, Perry A. Borden, of the Hydro-electric Power Commission; members of the Executive Committee: O. V. Anderson, Toronto and Niagara Power Co.; L. B. Chubbuck, Canadian Westinghouse Co.; W. P. Dobson, Hydro-electric Power Commission; S. E. M. Henderson, Canadian General Electric Co.; George D. Leacock, Moloney Electric Co. of Canada; Walter F. Wright, Eugene F. Phillips Electrical Works.

The meeting was followed by an informal dinner, at which Mr. Calvert Townley, president of the Institute, was the guest of honor.

Following the dinner, the retiring president, Mr. Cooper, in a few words thanked the members for the hearty co-operation they had given him during his term of office and called on Mr. Ewart, the newly-elected chairman.

Mr. Ewart dwelt briefly on the progress of the Toronto branch of the Institute during the past year and expressed the opinion that it would be necessary, in the very near future, to obtain larger quarters for their meetings than those being used at the present time, in the Engineers' Club. "The membership is increasing," said Mr. Ewart, "and we must provide the necessary accommodation." He assured the members of his best efforts to live up to the high standard of service of last year's president and thanked them for the confidence they had placed in him by electing him as their chief executive for the coming fiscal year.

All the past presidents of the Toronto branch, since the re-organization, were present at the meeting, and the chairman, Mr. Cooper, in calling on Mr. Wills Maclachlan, one of the past presidents of the branch, remarked that it was very gratifying to see so many of the past executives present at the meeting and believed that to keep an organization together was to keep the interest of past executive officers.

Mr. Maclachlan, in officially welcoming President Townley, stated it was not very often they had the honor of entertaining the president of the Institute and felt sure every member would derive great benefit from Mr. Townley's talk on the Institute's work. Although there are members of the Institute all over Canada, stated the speaker, Toronto and Vancouver are the only centres completely organized, and, though it would be well to have all those men who are connected with the A. I. E. E. linked in one group to deal with Institute affairs as a unit, organization on this basis would take considerable time and a big outlay of money. Continuing, he urged the members to co-operate with the executive and not leave all the work to the officers. They have their work to perform, he stated, and it will be necessary for the members to do more than interest themselves in the technical end of the affairs of the Institute if it is to prosper.

The chairman next called on Mr. Townley, who spoke at some length on the work of the Institute. Mr. Townley's remarks are reviewed herewith.

President Townley's Address

In an organization like our's, began the speaker, that goes on from year to year, it is necessary to stop once in a while and take stock to see which way we are going. The Institute, which has now passed its thirty-fifth birthday, boasts a membership of over 11,000. At the end of the first seventeen years of the life of the Institute, from the year 1884 to 1901, the membership totalled about 1,200, and the balance has been accumulated since that date. The Institute is the second of its kind in size in the United States, exceeded only by the American Society of Mechanical Engineers, which has a little over 12,000 members on its roll. We are, therefore, in a healthy state, as regards number of members. There are a number of societies spread all over the country that might have come into our body, said Mr. Townley, but too rapid growth is not always the best thing. "We should do all we can to cover the field of electrical engineering thoroughly and must not confine ourselves to specialties."

Speaking on the subject of prestige, Mr. Townley expressed his gratification at the position the Institute held in the public eye today. Our members all work together, and this is the reason we have increased our standard of prestige, which we must preserve. Our Committee on Standards is recognized as the authority; their standards are adopted as a matter of course. Our authority on electrical engineering subjects has been recognized by the public and on many occasions officers of the Federal Government in the United States has called upon the Institute for suggestions. We are represented on the International Electrical Technical Commission, which is composed of delegates from various foreign countries, for the purpose of adopting international standardization. The delegates on this commission are appointed by the government of their respective countries, with the exception of the American delegate, who is appointed by the Institute. As a further instance of the high standard of prestige enjoyed by the Institute, continued the speaker, only recently a communication had been received from electrical interests in Sweden, who contemplated holding a congress next year, requesting the opinion of the Institute on this matter and asking if we approved and would support this conference. All these things show that our actions have found favor and have earned the respect of others. Andrew Carnegie, when he gave $1,500,000 for the purpose of building a home for the allied engineering arts in New York, in 1902, stated that his idea was the progress of civilization and he knew of no better way to further this cause than by securing the co-operation of engineers in general.

Work of Institute Expanding

The original purpose of our Institute was to advance the theory and practice of electrical engineering and our membership consisted chiefly of scientific men, professors, and men of like calibre, and our work consisted of the preparation of highly technical papers and the discussion of these. However, continued the speaker, with our growth, though we still maintain and develop the technical end, the bulk of our membership is now composed of men engaged in the different branches of electrical engineering; public utilities, power plants, railroads, etc., with the result that the character of our work has changed and we have a larger field to cover than in the past, which is quite natural as every organization must do more if it expects to thrive and prosper. With this development has arisen the difficulty of cohesion. It is hard to keep 11,000 men, spread over so large a territory, together. This difficulty is resulting in the organization of sections and centres all over the country. Even after the establishment of these various sections, however, it is quite a problem to keep the different bodies together as a unit. A great number of the members do not take an active part in the work of the Institute. They feel they are paying for their privilege and do not have to go farther than this and it is an increasing difficulty to make the individual member feel that he has just as much to say as the other man and that he has the same duties to perform. Mr. Townley emphasized this point and impressed upon his hearers the fact that every man is an important part of the organization. If we try to instil this spirit into our organization, we will have done our part to make the Institute as democratic as possible.

Financial Condition of the Institute

Speaking on the financial condition of the Institute, Mr. Townley stated, though the last report showed a deficit in the neighborhood of $30,000, this sum had been reduced to $20,000 and he had reason to believe that within a year or so this would be entirely wiped off, as the outlook was bright and the enlarged revenue being realized from the expansion of the Institute's publication from a leaflet to a journal would more than offset the financial outlay on it. Mr. Townley speaking on the question of an advance in membership fee, stated that the Board of Directors of the Institute had decided almost unanimously that the present was a bad time to do this and looked forward to an increase in revenue from the advertising pages of the journal. This journal at the present time comprises something like thirty-five or thirty-six pages of advertising space and is steadily growing.

Mr. Townley called the members attention to the amendment to the constitution which they were asked to vote upon at the present time. Considerable difficulty had been experienced in trying to get the members to vote on questions concerning the business of the Institute. He urged every member to vote, one way or the other, to send in a vote, as they wanted to register the views of the entire membership on this important matter.

Mr. Townley, speaking on the plan of organization which had been published recently in the Institute's journal, pointed out that this was the greatest attempt at organization ever made on the continent. Should this plan go through, he said, the Toronto section could take to themselves a great deal of credit, as the plan was submitted by their new chairman, Mr. F. R. Ewart.

He urged co-operation of the members with the various branches of the engineering profession. You can do much, he said, to improve the present unsettled condition in business circles, and to teach the public not to be led away with the foolish ideas being advanced for the solution of this industrial unrest, as it is called. The engineer, he pointed out, is especially qualified to do this thing; his word is believed, because in dealing with facts his policy has always been to obtain figures, reach a solution and make a report, without regard to whom that report may hit, and he does not confuse opinions with facts. You are believed because you are engineers and in the present state of disturbance, the voice of the engineer should be raised to quell the foolish ideas being advanced by the agitator.

Speaking on the feeling that exists between the members of the Institute in Canada and the United States, Mr. Townley said, "We, on the other side, need your help and I am sure you have a similar feeling for the engineers of the United States. We have the strongest desire that the ties be as close as can be and believe that nothing will occur to interfere with them in any way." He believed the Institute was in a position to go ahead and that there was every reason to believe there is a bright and prosperous future ahead of it.

The speaker at the Electric Club of Toronto, on April 23rd, was Mr. F. S. Scott, M.P., president of Getty, Scott Ltd., shoe manufacturers, Galt, Ont. Mr. Scott gave a very lucid and logical outline of the present conditions in the shoe industry in Canada.

Public Utilities Commission of British Columbia Has Been Dissolved

The Public Utilities Commission of British Columbia has been dissolved by the legislature of the province. The act repealing the Public Utilities Act of 1919 has been passed by the legislature at Victoria, and at this writing, April 17, only requires the signature of the lieutenant-governor to become law.

One of the reasons for the repealing of the Act was that the railway lines of the British Columbia Electric Railway Company, were, by the act of the Dominion legislature, taken from the control of the province, and placed under the Dominion Railway Board; that the telephone company of B. C. was placed under Dominion control. This left, in the opinion of the members of the government, very little scope for the provincial commission, notwithstanding the fact that petitions had been presented to the Dominion government to have the British Columbia Electric Railway Company placed back under provincial control. The removal of this railway company from the jurisdiction of the provincial commission was clearly established as being a mistake on the part of the Dominion House of Commons, and already reports have been received in Vancouver that the Act amending this control and placing the B. C. Electric back under provincial jurisdiction, has been passed.

The provincial legislature of British Columbia provides in their repealing of the Public Utilities Act for the revival of all agreements binding the B. C. Electric Railway Company as if the Public Utilities Act had never been passed. Just what effect this will have upon the six cent fare charged in Vancouver, New Westminster and other communities, is somewhat doubtful. The company's franchise provides for a fare of five cents. The six cent fare was granted until April 9, 1919, and consequently the provincial government, by the Public Utilities Act, extended this privilege until the Public Utilities Commission could investigate the necessity for such a fare. The B. C. Electric Railway Company being removed from the jurisdiction of the province, its fares were confirmed by the Dominion Board of Railway Commissioners, and it is now under such confirmation that fares are being charged. If the Dominion government should cancel this jurisdiction over the company, this would throw it back on original agreements, and it would then be without recourse to either Dominion or provincial commissions.

Confiscation Clause

Another curious feature of the repealing act of the provincial government, is a clause which might be said to confiscate one-half of some $48,000 now held in trust by the B. C. Electric Railway Company. It was decided in the Public Utilities Act that the provincial government continue the six cent fare after April 1919 and that the additional cent over the five cent statutory fare should be paid into a fund until such time as the provincial commission could investigate the merits of the six cent fare. If it should have transpired that the company was not entitled to this additional cent, the fund was to go to the Vancouver General Hospital. The contributions to the fund up to July 7, 1919, amounted to about $48,000, when they stopped owing to the company coming under the jurisdiction of the Dominion government and having its fares approved. The repeal act now contains a clause to the effect that this fund shall be divided equally between the B. C. Electric Railway Company and the Vancouver General Hospital without suggesting that any investigation as to the merits of the fund be made whatever. Whether this is a confiscation or not, it is hard to say, but it is quite probable that the cost of giving service from April to July 7, 1919, warranted much more than a six cent fare, in which case the company would be entitled to the whole of that fund.

Automatic Signals for the Spacing of Trains

On Steam Railway Systems Have Become a Factor in Safe Operation—Also Increase Capacity of Trackage

By C. H. Tillett, Signal Engineer, G. T. R. System

The automatic signal, for the spacing of trains on steam railroads, has become a factor in the safe operation of trains that cannot be overlooked. The more extended use of automatic signals is, perhaps, to some extent responsible for a decrease in the rate of track building in the United States during the past few years owing to the increased capacity of a signalled over an unsignalled line. The improvement that has taken place in the design of signal apparatus, and the better understanding of the automatic signal by railroad operating men has been the cause of it being applied to more track each year. The report of the Interstate Commerce Commission for the year ending January 1st, 1919, showed that there were 191,133 miles of road and 221,788 miles of track classed as passenger lines operated, and of this 36,989.4 miles of road and 59,458.2 miles of track were operated under automatic signals. This is approximately three times the amount in use ten years previously.

To one not having had opportunity to investigate the automatic signals, to the extent of more than a passing glance as the train goes by, the explanation that it is done by electricity usually suffices, but for those who care to know how it is done electrically it will be necessary to acquaint him with some of the fundamentals, and also it will be necessary to explain to the layman why it is done, and what the different indications of a signal, say of the semaphore type, means. It must be remembered that the automatic signal as we find it today is a growth. The accumulated ideas of many minds are assembled to secure the greatest degree of safety of operation. It will not be surprising to find that there are several methods of achieving the result in use today. They are all, however, based on the same idea,, that is, the track circuit. The indication of the signal may be given by lights of different colour, or position, or by the position of a semaphore arm, and the result obtained by direct or alternating current, but the foundation of it all is the simple track circuit.

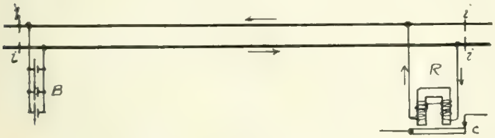


Fig 1

The Track Circuit

The running rails of the track are bonded together to improve the conductivity of the rail joints, and a definite portion of the track is insulated from the adjoining track by insulated rail joints, the insulating property being wood fibre. The length of this portion of the track is governed by the kind and condition of ballast in use, it being possible to operate a track circuit two miles long with stone ballast and the use of alternating current. However, for direct current use they are seldom longer than 3,000 feet. The direct current track circuit, being more common than the alternating current track circuit, (and as this article will only deal with direct current apparatus) it only will be given attention here. Fig. 1 shows diagramatically a direct current track circuit. The heavy lines representing the running rails, with I. the insulated joints, are connected with a battery B. at one end and a relay R. at the other. It will be seen that the relay is normally energized, thus closing the contact C. for the making of control circuits. Fig. 2 shows the symbol used to represent a relay and will be so used throughout this article, the number of separate circuits that are broken by one circuit being represented by the number of contacts shown. The passage of a train or engine over this section of track, as shown by Fig. 3, short circuits the rails, and the current that normally flows through the coils of the relay is directed through the wheels and axles of the cars: the armature of the relay falls away from the magnet and breaks the control circuits, thereby actuating other relays as will be shown later. The relay and battery connected to the track are always known as the track relay and track battery respectively.

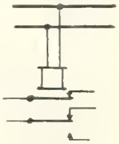


Fig 2

The track battery may be a storage cell, or caustic soda primary, or gravity battery. The latter was the first to be used to any extent and its characteristics are excellent for this purpose, as it has a relatively high internal resistance, and stands the continual drain of the normal track circuit, as well as the heavy drain of the track short circuited by a train, without harm other than regular exhaustion. From two to four cells are used in multiple to good advantage. The caustic soda primary cell is becoming quite extensively used on track circuits and when so used, on account of its low internal resistance, an external resistance is placed in the connection between the battery and the running rail. The amount of this varies with the physical conditions of the track and the resistance of the relay used. It is generally within the limits of .2 ohm to one ohm, and serves to cut down the drain on the battery when a train is on the track circuit. On account of the greater capacity of the caustic soda cell over the gravity cell, and also being more immune from the effects of cold weather, it is rapidly supplanting the gravity cell. There has also been developed a caustic soda track battery having by special construction almost the electrical characteristics, as regards internal resistance, of the gravity cell, and it has met with good success. The storage battery when used also carries an external resistance for the same purpose as for the primary cell, and owing to its higher voltage the resistance is relatively larger.

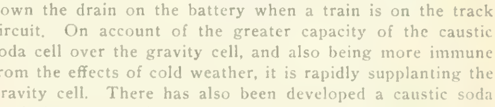


Fig 3

The direct current track relay is well developed and standardized now, but it has not always been so. The first ones were used as long ago as 1875. The object has been to get as rugged an article as possible to do the work and to get as low contact resistance as possible in a manner that will be constant and durable and immune from the possibility of fusing in case of lightning, or other excessive current passing through them. The coils were first wound for sixteen ohms resistance, then eight and then four which has held for a number of years as standard on most roads until recently there has been a considerable number of two ohm track relays installed, and good results obtained, especially on circuits of over 3,000 feet length. The influence, on the track circuit, of stray currents on tractive lines and street cars is such that relays of lower resistance than two ohms are not likely to become used except under exceptional circumstances.

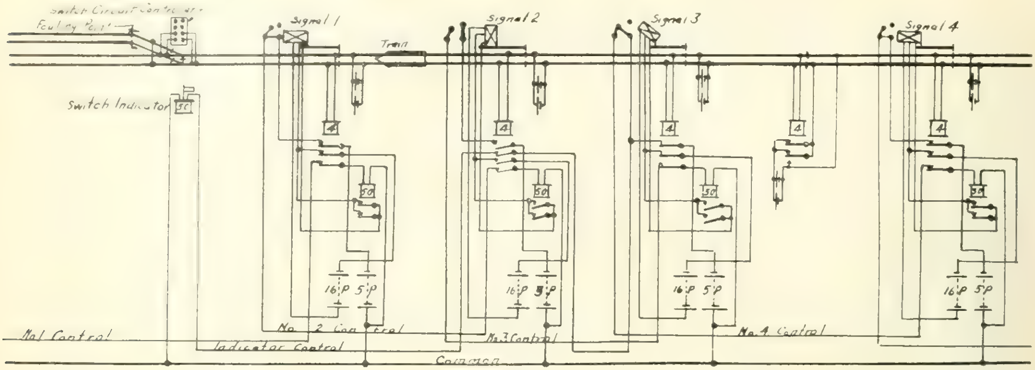


Fig 4

The reader will observe from the diagram previously referred to that the track circuit is operated on the closed circuit principle. That is, the relay must be energized in order to close its contacts. This is a principle that is followed throughout the design of automatic signals and is diverted from on few occasions. Any dislocation such as a broken track rail, broken connection, or exhausted battery allows the relay to open and the signal to display a stop indication just the same as if a train were in the block. Automatic signals, to be a safety device, must know that everything is alright ahead before they tell the engineman to proceed, and no effort is spared to achieve this result.

Signal Indications

The position of the semaphore arm conveys the meaning of the signal to the engineer. Earlier types of semaphore signals gave their indications by two positions of the arm; that is, the arm horizontal indicated stop and 60 or 90 degrees below the horizontal indicated proceed. A signal for proceed with caution being given by an arm of a different shape or colour. For steam railroad work the upper right hand quadrant semaphore, giving the stop indication with the arm horizontal, the caution indication wth the arm 45 degrees, and the proceed indication with the arm 90 degrees above horizontal, has become generally used. Upper quadrant operation solved many problems of the early signals. The mechanisms must be so constructed that they will assume the stop position by gravity when the current that holds them is cut off. This required heavy counter balancing of the lower quadrant signal to offset the weight of the blade. It required sufficient counterbalance to offset a snow and sleet load in addition to the weight of the blade, with the resultant energy waste of operating this all the time anticipating the winter load. With the upper quadrant the snow and ice load makes the signal that much safer.

Night indications on semaphore signals are accomplished by moving lens of different colours in front of the lamp. The lens are mounted in a semaphore spectacle that is part of the semaphore arm. Red is the universal danger or stop indication. Earlier standards used green for caution and white for clear, but almost every road of consequence now uses yellow for caution and green for clear. The use of white for clear or proceed was found to be against the first principles of safety for the reasons that a broken red glass would give a proceed indication out of a stop signal.

The entire elimination of the semaphore arm for day signalling is rapidly coming into use. By the use of lamps of high luminosity and lenses of the correct shape it is possible to give an indication by lights that can be seen at a sufficient distance to be practical in the most adverse conditions of bright sunlight. No reflectors can be used to help the lamp because of the danger of phantom indications from reflected outside light. The light is located at the focal point of a prism glass reflector which throws the light in a beam in the desired direction.

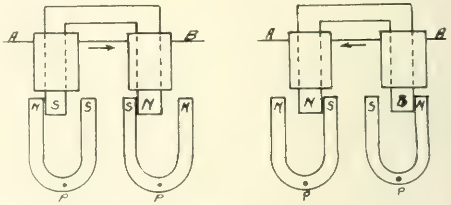


Fig 5

Light signals are employed to give their indications by lights of different colours or by the position of a series of lights. Coloured light signals use the same colour as the night indication of the corresponding semaphore signal and position light signals give their indications by a row of lights that correspond to the position of the semaphore arm as seen by the approaching train. Neither the position light nor the coloured light signals have become widely used as yet, but they both have prospects of being used extensively in the future for installations where alternating current is used.

Direct Current Signal Control

The track circuit, that forms the basis of the control for the automatic signal, seldom can be used to operate the signal directly without the introduction of intermediate relays. These work on the same principle as the track relay, but are wound to much higher resistances. The current that operates them is carried through several track relay contacts if need be and often through several miles of line wire, so for efficiency's sake they are operated by a current of a higher voltage. Resistance of control relays range from 50 ohms to 1,000 ohms, being governed by the voltage of the battery that they are to be used with. Since the current that is required to pick up the armature is held about constant regardless of the resistance of the relay it is desirable not to use a higher voltage than is required for the pickup of the relay, as any increased current used by the relay is wasted. The specifications of the Railway Signal Association require a direct current relay to pick up on .72 amperes and drop away at .035 amperes. In reality the operating current is enough greater to leave a fair margin for contact resistance of the track relay or other controlling contacts. The higher the operating voltage the less likelihood there is of failure through an increase in contact resistance of a defective contact in the control circuit, as the relative resistance of the contact to the resistance of the whole circuit is less and therefore the decrease in the current is less than if the relay was of lower resistance and the operating voltage less. On the other hand the higher resistance relays are held by some to be more easily damaged by lightning disturbances.

Neutral Line Control on Double Track Signals

There are two general schemes of control of automatic signals that deserve consideration. First: the normal clear system, with which the signal is at proceed unless the track conditions of the block are favorable to advance a train into the block. Second: the normal danger signal with which the signals only take the proceed position when the track conditions are favorable to advance a train into the block and there is a train approaching the signal. Figure 4 shows a simple form of circuit for normal clear signals for movement of trains in one direction. The track relays are marked with the Fig. 4 indicating their ohmic resistance. Similarly the control relays are marked 50. A train is shown in the block between signals 1 and 2, causing the track relay at signal 2 to be open. The batteries that operate the signal are labelled 16 P and the control batteries 4 P, indicating the number of primary cells in each battery. The position of the signal operating battery branches after having gone through the track relay contacts. One branch goes direct to the signal mechanism, and the other goes through the contact of the control relay before going to the signal mechanism. The negative of this battery goes direct to the signal mechanism. The reader will appreciate that the signal mechanism will operate the blade to 45 degrees when the circuit comprised of the first branch of the positive battery and the negative is complete to the signal mechanism, and that it will operate the blade to 90 degrees when both branches of the positive battery and the negative battery are completed to the signal mechanism. The train in the block of signal 2 holding the track relay open has cut both branches of the postitive battery of signal 2 and the signal, being deprived of energy falls to the stop position. In doing so, the circuit breaker, shown symbolically near the blade of the signal, has opened. Energy is removed from the control relay of signal 3 when this has happened, as the control battery at signal 2 is cut off from the No. 3 control wire; the track relay at signal 3 being picked up, but the control relay being open allows signal 3 to clear to the 45 degree position. In doing so the circuit breaker operated by the blade of signal 3 has closed. This completes the circuit of control relay at signal 4 and signal 4 is in the 90 degree or clear point. A switch is shown in the block of signal 1 with a circuit controller attached to the points in such a manner that unless the points are snugly closed for the main line the track circuit is shunted by the circuit controller. An indicator at the switch indicates the approach of a train from signal 3. While known by the name of switch indicator this adjunct to a signal system in reality indicates at the switch of the occupancy of the blocks in the rear of the switch. The type of control just described is known as neutral control, to designate the fact that all the relays used are neutral relays.

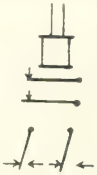


Fig 6

Polarized Relays

Neutral relays have only been considered so far in this article, and may be defined as having only one armature which is attracted to the poles of the electro-magnet when the magnet is energized, and falls away from the poles when the magnet is de-energized. This differentiates this class of relays from what is known as polarized relays, that have an armature in the form of a permanent magnet that is moved by the polarity of the electro-magnet. Fig. 5 shows the principle of the polarized relay as used in signal work. In the left hand figure the current of the electromagnet is presumed to be in a direction from A to B, and this sets up a south pole in the left hand pole piece, that attracts the north pole and repels the south pole of the permanent magnet. In the right hand figure the current is

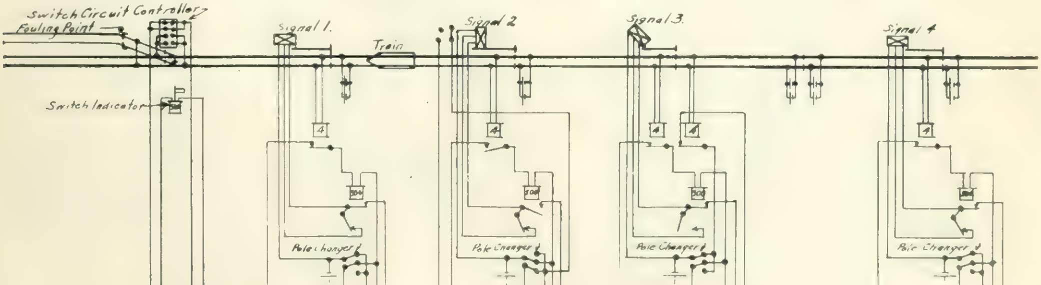


Fig. 7

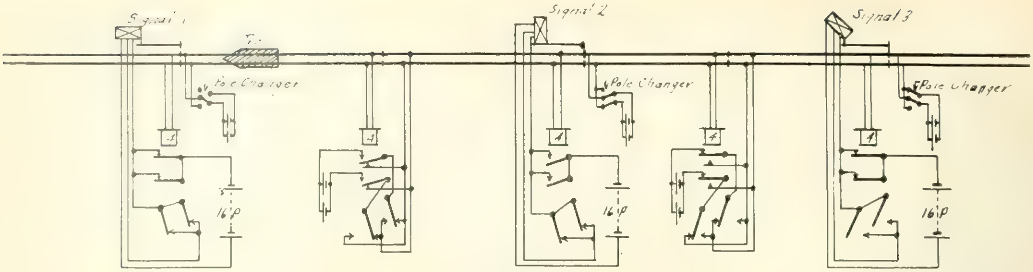


Fig. 8

from B. to A., and the polarity of the electro-magnet is reversed with a consequent movement about the pivot P. of the permanent magnet. The permanent magnet is made the vehicle for carrying contacts for the control of other currents. In construction the permanent magnet is set at right angles to the electro-magnet and neutral armature also operated by the same electro-magnets. A polarized relay is shown symbolically by Fig. 2, the horizontal contacts being the neutral and the vertical ones the polarized contacts.

Polarized Line Control

Fig. 7 shows an adaptation of the polarized circuits for the control of automatic signal on a track of single direction of traffic. The pole changing switches are operated by the signal mechanism when the blade passes a point 43 degrees above the horizontal. This insures that it will be in one position when the blade is 45 degrees or more above the horizontal and the other when the signal blade is lower than that. In other words the caution and clear indications, not requiring the signal in the rear to display caution, must send out the control current in the opposite polarity from the stop indication. One advantage of the polarized line control of double track signals is that the control wire can be broken through the switch circuit controller instead of depending on the switch circuit controller to shunt the track as was shown in Fig. 4. To secure this safeguard with neutral relays would require the use of two neutral relays with the attendant expense of additional line wire.

Polarized Track Control

A system of control for double track signals without the use of line wire is shown in Fig. 8. In this scheme the polarized relay is used directly on the track and the pole changing switch is used to reverse the polarity of the track battery. This scheme never became widely used, owing to the difficulty encountered in case of foreign current in the track circuit caused by the return circuit of systems of electric traction that use direct current propulsion, and the trouble of maintaining low contact resistance of the relay points where the block length is more than one track section long, requiring a repeating cut section.

Sectionalizing Track Circuits

The illustrations in Figs. 4, 7 and 8 will serve to illustrate the three different methods of operating track circuits over a block that is too long for one track circuit to operate. In Fig. 4, the block of signal 4 is shown cut into two track sections. The track battery at the cut section goes through the contacts of the cut section relay before getting to the track section and operating the track relay at signal 4. As a matter of additional safeguard connection is made to a contact on the cut section that is made when the relay is de-energized, so that this relay being open not only cuts the track battery off from the track section in the rear, but it shunts the rails of that section. Fig. 7 has the block of signal 4 cut into two track sections by placing the two track batteries in the centre of the block and feeding both ways. This can be done with the polarized line control or a system of neutral line control employing a 45 degree control relay and a 90 degree control relay, by breaking the control wires through all the track relays in the block. The repeating track cut for polarized track requires the neutral contacts of the repeating cut section relay, to de-energize the next section when it is open, as well as the polarized contacts to act as a pole changing switch to reverse the polarity of the track battery at the cut section, as regards the track in the rear. The cut section of Fig. 8 shows how this is accomplished.

Normal Danger Signals

We next come to the normal danger type of control for double track signals. Fig. 9 shows a circuit for an installation of this nature. It will be observed that in the normal danger signal system, that the signal arm displays the stop indication unless a train is approaching the signal. There

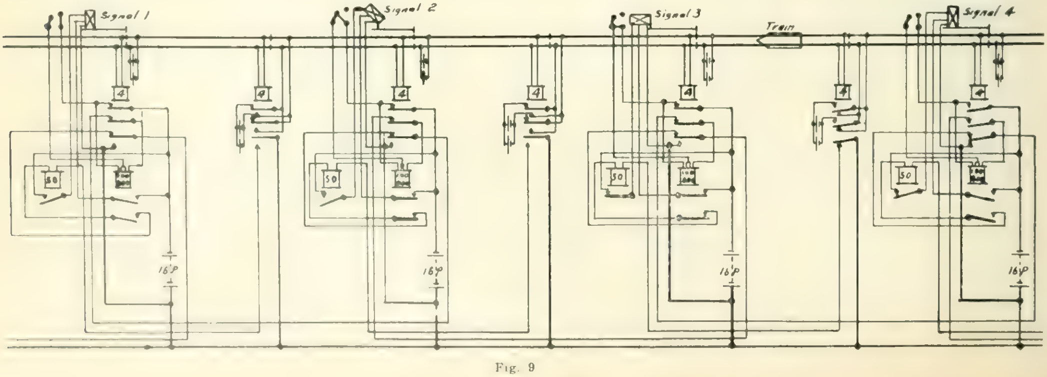


Fig. 9

are distinct advantages gained by such a system. The holding current, that is, the current that holds the signal in clear position after the motor has brought the blade to that position, is being used only a short time as compared with the normal clear signal system, thus a considerable saving of battery energy is affected. The possibility of the signal mechanism becoming stuck through freezing or other mechanical defects, lessens the liability of danger through being held in the clear position as such a defect would in all probability occur through the signal arm being in one position for a considerable time. With this position at danger, no safer signal could be imagined.

In Fig. 9 is shown a type of relay that has not yet been discussed. The relay designated as 100 ohms and 800 ohms is known as a differential relay. It will pick up through the 100 ohm coil, and when the signal has accomplished its movement to 45 degrees, a circuit breaker on the signal throws the current on to the 800 ohm coil, thus making the holding current less than it otherwise would be. The relay is constructed to hold but not pick up on the 800 ohm coil.

At the cut section in advance of the signal, a contract is made through the back point of the track relay that completes the control circuit, providing the track relay in the rear of the signal is energized. This allows first signal in advance of the de-energized track section to go to the 90 degree position, providing the signal in advance assumes the 45 degree position at the same time.

There are other circuits designed to give the same result as the circuit outlined in Fig. 9, but they are not so generally used and it will be sufficient to know that they all depend on the back contact of the track relay in advance of the signal to effect the clearing of the signal.

Further Stage in Legal Fight Between Montreal Companies

A still further stage in the legal fight between the Montreal Light, Heat and Power Consolidated and the Montreal Public Service Corporation has been reached. The First Division of the Court of Review has reversed the judgment of the Superior Court and dismissed the action for $10,000 damages brought by the Montreal Light, Heat and Power Consolidated against the owners of the Linton Apartments, Montreal. The litigation arose over contracts for lighting these apartments. The Montreal Light, Heat and Power Company had a five years' contract to supply the portions of the Linton Apartments not controlled by tenants, and also to supply current to the tenants. The owners of the Linton Apartments terminated the contract and came to terms with the Montreal Public Service Corporation.

The Montreal Light, Heat and Power Company declined to accept this change as terminating contracts with individual tenants, and, therefore, desired to have the wiring connections remain, a position which the owners of the apartments refused to recognize.

The Judgment of the Court

The judgment of the Court was delivered by Mr. Justice Panneton, who declared "I am of opinion that upon the documents produced, the tenants had no right to make with plaintiffs a firm contract of lease for five years. They ought to have inserted a clause that it was subject to be terminated whenever the Linton Company notified them to that effect.

The tenants were not free under their leases to take electricity from whom they pleased. It was for the Linton Company to say from whom to take it so long as they did not suffer from any changes. The tenants not being capable of making a firm contract of lease with plaintiffs for a period exceeding the five years and their extension, I believe that plaintiffs themselves were also incapable of making such contracts with the tenants without the consent of the Linton Company.

We must not lose sight of the fact that the Linton Company is the owner of the building, that it also owns the wires in it, that the room where plaintiff's transformer was placed belongs to them, that the underground duct or conduit leading from the transformer to plaintiff's street pole was also provided by the Linton Company. It is true that by leasing the premises to the tenants they at the same time leased to them the use of all the fixtures inside their apartments necessary to light themselves with electricity. But, as to the electricity itself, the Linton Company kept the control of who was to supply it. Since plaintiffs stipulated in their contract with the Linton Company an exclusive privilege to furnish electricity to the tenants for five years, it must consider there is value in such privilege. The Linton Company, being the master of the building, their rights as such are limited only to their extent of the rights they conferred on the tenants. Having kept the mastery of the choice of who shall furnish electricity to their tenants, any company not chosen by it attempting to supply such electricity commits an invasion of its rights of ownership. After being notified of the termination of its contract with defendants, and when this contract was so terminated, plaintiffs had no more rights to have access to that building to furnish electricity to tenants. Before contracting with the tenants it was its business to ascertain if the tenants could make with it such contracts as were made. If it did not make such an inquiry it took the risk. If it had it would have found out that the lessor had reserved the right to change the supplies of electricity.

If the interpretation of the doctrine of election made by plaintiffs is correct, then the privilege of exclusiveness which plaintiffs evidently considered valuable is taken away from the Linton Company for such a length of time as these contracts between plaintiffs and the tenants exist beyond the terms of the contract between plaintiffs and defendants. If these contracts are to be respected by the Linton Company it could not give a similar exclusiveness which plaintiffs had to any other company except to commence after the expiry perhaps of another five years if the contracts made by plaintiffs and the tenants commenced to run only in the last month of the duration of the contract between plaintiffs and the Linton Company.

Will Lecture on Toy Merchandising

Mr. A. C. Gilbert, of the A. C. Gilbert-Menzies Company, has arranged to give a lecture on "Scientific Toy Merchandising" at the Central Y. M. C. A., corner Yonge and College Streets, Toronto, on the evening of May 10. Mr. Gilbert will give a demonstration of the value of a number of electrical toys, including the use of wireless sets. The meeting will be open to the trade and dealers particularly are invited.

Mr. J. A. L. Craig, who was prominent about thirty years ago as a manufacturer of dynamos and as an engineer, died in Montreal on April 21st, aged 84 years. He was credited with the manufacture of the first dynamo made in Canada in 1879. Mr. Craig created a large business, including the ownership of an electric plant at St. Cunegonde, which supplied power to part of Montreal. He made municipal electrical installations at Granby, Coaticook, St. Jerome, St. Therese, Beauharnois and other places.

The Scientific Truth About Electric Water Heaters

By Mr. E. I. Brown*

During the past few months in this country and in the United States, there have been produced a number of electric water heaters of different types. Some startling claims are made in behalf of some of these, and in the interest of all the fundamental facts on which heaters are based should be clearly set forth.

In the first place, every engineer and electrician worthy of the name knows that the amount of heat generated from any electric circuit depends only on two things, namely, the amount of current flowing in the circuit and the amount of resistance offered by the circuit to its flow. The heat generated is directly proportioned to the square of the current value while it varies directly with changes in the value of the resistance. This effect might be called "Electric Friction" as the more current we try to force through, the more friction there is.

To get heat from any circuit it is only necessary to pass a current through it. No matter what the size of the current or amount of resistance, theoretically some heat is generated. In circuits where both resistance and current value are low, no appreciable heat is felt because the quantity generated is so small that it is immediately dissipated. As current values increase, however, the amount of heat generated is rapidly increased and if these values be increased sufficiently, fusion of the conductor will take place.

In electric heating units the point to consider in design from an efficiency standpoint is to get the maximum amount of heat for the minimum amount of current consumed. It is not a problem of getting heat alone, because under proper conditions enough heat can be supplied to burn up a wire instantly. It is a problem of getting efficient heat.

The problem therefore resolves itself down to selecting the most economical balance between current and resistance, and inasmuch as practically all heating devices are used on lines of constant voltage, this also means constant current and constant resistance. Therefore, in beginning to design any heating device, the heating engineer needs first of all to know the voltage of the circuit on which it is intended to operate. He then must select a suitable resistance so that the current value will not be excessive from the point of view of both safety, and economy of operation.

The Heating Value of Current

In order to get an idea of the heating value of a current and the relative importance of the current and resistance in producing the heat, let us consider the ordinary 110 volt lighting circuit and assume that the circuit has a resistance of 110 ohms. Then according to Ohm's law we have $C = 110/110$ or one ampere where C=current. Now as pointed out above the heat value of the current is the product of the square of the current multiplied by the resistance. Applying this rule we find the heat H generated by the above conditions to be

$$H = 1^2 \times 110 = 110 \text{ units.}$$

It does not matter for the purposes of this article in what values we read H as the purpose is only to show how the amount of heat varies with changes in resistance and current values.

Now instead of a resistance of 110 ohms let us assume that this is only 55 ohms. The current value then will be doubled or 2 amperes and the heat value of the current will be

$$H = 2^2 \times 55 = 220 \text{ units}$$

Now let us reduce the resistance of the circuit still further and assume a resistance of 11 ohms. The current corresponding to this value will be 10 amperes and the heating value will be

$$H = 10^2 \times 11 = 1100 \text{ units}$$

It will, therefore, be apparent from the above three examples that the heat value is influenced very much more by the change in current value than in resistance, and that a small increase in current has quite a material effect in the amount of heat developed. This is why manufacturers of heating goods do not recommend articles rated for 110 volts to be used on circuits above 115, as the increased heat generated soon burns out the element.

It will further be seen from the above that the matter of getting the correct amount of heat from any device largely depends on the amount of current it is intended to use and this in turn depends on the resistance of the heating element. Now the wire which most manufacturers of heating goods use today is of special composition and is the product of one company and gives high efficiency, from 95 to 98 per cent. Therefore, the efficiency of the apparatus of all manufacturers of heating goods using a resistance will be approximately the same assuming an equally good design of the particular piece of apparatus.

Two Types of Water Heaters

Now let us apply the above to water heaters. These are of two types, the continuous and those which heat water just as required. The present article is not particularly devoted to the continuous heating type as these have been with us for a number of years and there is very little to be said about them, except that they are successful and are specially desirable from the central station's viewpoint, and also from the consumer's if he can secure an advantageous rate for their operation. We are more interested at present in the type of water heater which heats a small quantity of water as required. Two or three of these have recently come on the market, and it appears that others are under way, one especially, suggesting that manufacturing may begin as soon as the people buy their stock.

The principle of their operation is very simple. A stream of water is allowed to flow through the pipe to which the heater is attached and if hot water is desired the current is turned on by means of a switch or in some cases by the handle of the faucet operating the switch. One particular type which is non-portable screws on to the pipe and the faucet handle operates the switch by turning to the right when hot water is desired, and cold water is secured by turning to the left, the cold water coming through a bypass.

Portable Heaters

For purposes of classification we might divide water heaters of this type into two classes; portable and non-portable. Of the first class there are one or two on the market. These claim to be operated from a lamp socket and therefore the maximum current capacity allowable is 660 watts or 6.6 amperes at 110 volts. The amount of current that these heaters take as a maximum is therefore fixed and cannot be varied unless the line voltage is varied in proportion. Now one kilowatt hour of energy contains 3,412 British thermal units, which is the engineering heat unit. We need not go into the method of arriving at the above quantity here, but this can be verified from any handbook on electrical engineering. The amount of heat in one B.t.u. is that quantity which will raise one pound of water through one degree Fahrenheit.

Now let us assume that water is supplied to an electrical heater at an average temperature of 50 degrees F. throughout the year, and that we wish to raise this to the boiling point, or say 210 degrees F. The water must therefore be raised 210 degrees—50 degrees = 160 degrees, and to raise one pound of water it will take 160 B.t.u. Now one pound of water contains 1/10 Imperial gallons. Therefore one gallon needs 1,600 B.t.u. to raise it 160 degrees. No time element is here considered, but if we wish to raise one gallon of water to boiling point per minute, we must supply 1,600 B.t.u.'s per minute. We have shown above that one kilowatt hour contains 3,412 B.t.u.'s. Therefore one kilowatt minute contains 3412/60 = 57.9 or say 58 B.t.u.'s.

---

*[illegible]

Now our heater has a capacity of 660 watts. Assuming 100 per cent efficiency the maximum amount of heat we can get from this current is 660/1000 x 58 = 38 B.t.u. per minute.

Now we have seen that 1600 B.t.u.'s per minute will raise one gallon to boiling point, so 38 B.t.u.'s will raise 38/1600 of one gallon or slightly less than one-fifth of one pint. When we consider that the pint contains about two ordinary drinking glasses full of water, we see that a heater of this type cannot supply under the most optimistic conditions more than one third of a glass of boiling water per minute and the supply therefore gets down to a mere dribble. They can, however, supply about three times this amount at a temperature of ordinary bath water.

From the above it is quite clear that if water is to be heated in any quantity, we must supply current and plenty of it, and it is equally clear that no electric water heater operating from a lamp socket can supply any great quantity of water.

Non-Portable Heaters

There is, however, at least one electric water heater which gives boiling water practically instantaneously, and in quantities large enough to make it a real commercial proposition. Needless to say, heaters of this type are not lamp socket devices, but permanent installations. They require special wiring direct from the meter to the heater and consume a fairly large current. From the user's point of view, however, this is not a drawback, as the current is on for only a few seconds, and the consumption, therefore, is almost negligible. They are not quite so desirable from the central station's point of view, as in view of the large current consumed, the central station's engineers are inclined to throw up their hands and shout "Peak! Peak!" However, there is little danger of excessive peak loads in the use of these heaters, as the diversity factor in homes and office is enormous and where they are used in factories, the greatest use comes at a time when the power load is falling off. There would seem to be, therefore, a very real demand for a heater of this type and its great convenience once the public takes a real hold of it, will soon overcome objections on the part of the power companies.

In conclusion, it is in order to point out that regardless of all claims to the contrary by parties seeking to further their own interests, there is no kind of heating element in existence, nor can there be any, which can extract more heat from an electric current than it contains. The heaters now manufactured obtain from 95 to 98 per cent. useful work from the 3412 B.t.u.'s in each kilowatt hour of energy and no heater can therefore better this performance by more than 5 per cent. and this only on obtaining absolute perfection of heat transmission which is a thing so far unknown to science. In view of this therefore the public will do well to steer clear of all schemers purporting to increase or intensify the heating effect of current by four hundred per cent or for that matter, any other percentage.

The Rightway Electric Co. have opened offices at 616 Queen St. W., Toronto, where they will carry on a general repair business, motor winding, etc., as well as electrical contracting.

A Week of Safety

The Ontario Safety League has prepared plans for an intensive drive against accidents, to take place in Toronto the week commencing 26th of September. This week will be known as "Safety Week" and in that period the Safety League and the various organizations co-operating plan a drive against unnecessary accidents and fires.

It has been clearly shown by past experience that a reduction in fatal and non-fatal accidents can be made by teaching the public to "Think Safety." Similar campaigns in other cities have been a great success.

Sub-committees of the Safety League will cover such subjects as: publicity, bulletins, motion pictures, schools for industrial safety, statistics, boy scouts, women, traffic, schools and colleges, etc., etc. The various days of the week have been specially designated: Safety Sunday, with special sermons in the churches; Monday is Careful Day for Motorists; Tuesday will be Careful Day for Street Car Men; Wednesday is set aside for School Safety; Thursday will be At Home Day for Safety; Friday is to be called Careful Day for Pedestrians; and the slogan for Saturday will be "Safety for All, All for Safety."

During Toronto's "Safety Week" the various committees plan to teach accident and fire prevention to every man, woman and child in a spectacular educational campaign in which various forms of publicity will be used. The public will be reached by means of posters, bulletins, bill boards, street car cards, letters, advertisements, meetings and safety shows, and generally given a liberal education in safety.

Sir Adam Readjusts Rates

New high tension power rates were quoted by Sir Adam Beck recently to the deputation from Fort William which waited upon the Hydro Commission and the Premier at the Parliament buildings, in connection with the Great Lakes Pulp & Paper Company site.

The original contract with the pulp and paper company was for $17.50 for power delivered at Bear Point, east of Fort Arthur. This was based on a 4½ per cent. interest rate upon the money borrowed from the Government. Since the offer was first made the interest rate has been advanced to five per cent., and in consequence the original offer was withdrawn and a new rate set of $18.50 at Bear Point, which will also apply at a point midway between Fort William and Port Arthur. From this point west the rates will graduate upward, and it has been estimated that the price for high-tension power at Mission, Ont., the new site desired by the Great Lakes Pulp & Paper Co., will be between $20 and $20.50

Owen Sound has Electrical Page

Owen Sound is the latest town to fall in line with an "Electrical page" in the local paper. The page is composed of four advertisements occupying six columns with one column of reading matter. If one may criticize the page it would merely be to say that the amount of reading matter is small, the percentage usually recognized as about correct being 40 per cent. reading, 60 per cent. advertisements.

It is reported that a tacit agreement has been reached between the Transportation Committee and the Winnipeg Electric Railway, whereby the company is permitted to charge fares which will allow of an equitable return on capital. To provide for service extensions and liquidate indebtedness the company has called a meeting of shareholders for May 3rd, to consider the advisability of voting a $3,000,000 stock issue.

Transformer Oil As An Anti-Freeze Mixture for Automobiles

By Mr. F. K. Dalton

Transformer oil is the cooling and insulating fluid used in electrical transformers. It is a mineral oil obtained from crude petroleum and is supplied in two grades, namely: light and medium—the light oil only being considered in this report.

The specifications for oil for transformers state that the liquid must have the following characteristics: (a) Low viscosity, (b) high boiling and flash points, (c) freedom from moisture, sediment and impurities, (d) chemical stability under local high temperatures, (e) chemical neutrality towards metals and insulating materials.

In addition to meeting the above specifications and a few additional requirements in the matter of electrical insulating properties, transformer oil has a heat capacity of about half that of water and will not expand at low temperatures.

When used as a cooling medium for the engine of a motor car, during cold weather, this oil gives very good satisfaction. It circulates nearly as freely as water, and although its heat capacity is lower the supply of colder air which is available will fully compensate and the engine can be kept at normal temperatures while running.

A thermometer on the radiator cap is practically a necessity as an indicator of the amount of covering which the radiator requires.

When the car is allowed to stand for some time in cold weather this oil may commence to congeal. It does not freeze in the ordinary sense of the word. At temperatures of zero (Fahrenheit) and below, it thickens but will not burst the radiator or engine water jacket. If the oil becomes quite thick it will not circulate freely on again starting the engine. This feature, however, does not cause any great difficulty unless the motorists should completely uncover his radiator and immediately proceed along the road into the wind. In this case, of course, the oil in the radiator is not given any opportunity to warm up and it will continue to block circulation. The remedy is simply to run the engine for a few minutes before uncovering the radiator; once circulation commences there will not be any further trouble until the car has again been standing for sometime.

The boiling point of the oil is in the neighborhood of 300 deg. F., and its flash point is about 430 deg. F. Therefore, it will be realized that evaporation at ordinary running temperatures (170 deg. F.) is very slow and that there is no danger of fire from the oil.

The oil supplied for transformers is required to be free from moisture sediment and impurities and to be chemically stable at the local high temperatures of a transformer which are about the same as the maximum temperatures that occur in an automobile engine. Although some of these characteristics are required for electrical purposes, they are obviously good qualities in a cooling medium as they eliminate the danger of clogging the passages of the radiator with solid matter which may at first exist, or later be formed, in the oil.

The chemical neutrality toward metals and insulating materials is one of the best qualities which the oil possesses. It insures that there will be no injury, (corrosion or dissolving) to the metal of engine or radiator or to the fabric in the gaskets or connecting hose.

Oil usually softens rubber, but a test which lasted through the recent winter has shown that the effect on the rubber in the hose is very slight and does not necessitate replacing either of the connecting pieces of hose.

Transformer oil appears to be a very good cooling medium for use in cold weather. Its characteristics seem to excel those of any of the commonly used anti-freeze mixtures; for, in that there is absolutely no danger from freezing nor appreciable loss due to evaporation it is ideal.

There are, however, two feaures which are not altogether in favor of the use of transformer oil in cooling systems. Firstly, having a very low temperature co-efficient of expansion, it cannot be used in any thermal siphon system, but requires a pump to effect good circulation, and secondly, where leaks in the cooling system have been stopped by rust or other chemical compounds, the oil may remove these and leak out. This not only causes loss of oil but may allow the oil to spread over the surface of the engine where, due to heat and exposure to air it turns into a thin white smoke which comes up into the car and may be objectionable to passengers while the car is standing after a run. While running, however, there is no trouble from this source as the smoke is carried under the car by the passing air.

The cost of transformer oil is in the nighborhood of 55 cents per gallon.

New Technical Books

Theory and Calculation of Transient Electrical Phenomena and Oscillations, by C. P. Steinmetz; McGraw-Hill Book Company, Inc., New York, publishers; price $6.00. This is a third edition of a publication which appeared first in December, 1908. In the meantime the study of transients has been greatly extended and a large part of this book had practically to be re-written. There has also been added much new material. The book is divided into five sections: (1) Transients in Time; (2) Periodic Transients; (3) Transients in Space; (4) Transients in Time and Space; (5) Variation of Circuit Constants. Sections 2 and 3 of the present edition have much new material. In Section 4 a chapter has been added discussing the relation of the common types of currents to the general equations of the electric circuit. Section 5 is entirely new. The treatment of the subject is necessarily highly mathematical. The book comprises 700 pages; size, 6 in. by 9 in.; cloth bound.

Armature Winding and Motor Repair, by Daniel H. Braymer, A.B., E.E., Managing Editor Electrical World; McGraw-Hill Book Company, Inc., New York, publishers. This book gives practical information and data covering winding and re-connecting procedure for direct and a.c. machines. It is compiled for electrical men, responsible for the operation and repair of motors and generators in industrial plants and for repair men and armature winders in electrical repair shops. The scope of the work may further be judged from the following chapter headings: Direct Current Windings; Alternating Current Windings; Repair Shop Methods for Rewinding D-C Armatures; Making Connections to the Commutator; Testing Direct Current Armature Windings; Operations Before and After Winding D-C Armatures; Insulating Coils and Slots for D.C. and A.C. Windings Repair Shop Methods for Rewinding A-C Machines; Testing Induction Motor Windings for Mistakes and Faults; Adapting Direct-Current Motors to Changed Operating Conditions; Practical Ways for Reconnecting Induction Motors; Commutator Repairs; Adjusting Brushes and Correcting Brush Troubles; Inspection and Repair of Motor Starters, Motors and Generators; Diagnosis of Motor and Generator Troubles; Methods Used by Electrical Repair Men to Solve Special Troubles; Machine Equipment and Tools Needed in a Repair Shop. Well illustrated, 500 pages, 5 in. by 8 in., bound in stiff, dark green, cloth covers.

Shall We Divide Canada?

IN 1867 our fathers consummated at great price a union of all the provinces and interests of Canada. For over half a century the provinces of Canada have developed together, each the component of the other.

Canada must be bound together as it is to-day, not so much by the machinery of government as by ideas held in common by all and freely exchanged, so that all sections sympathize with each other. This result has been accomplished primarily by the press, particularly the weekly and monthly periodicals and business papers.

They have no local or sectional bias.They go to all parts of the Dominion. They serve all parts alike. Their service is in bringing all provinces close together into one great nation through one common understanding.

Canada must not be split into half a dozen sections—weak with the evils of sectionalism, disastrous in the extreme—overflowing with narrow provincialism.

Emanating from we know not whither, comes an idea that will rip asunder all the good done in over half a century of patient building.

It is proposed to tax the very thing that has bound Canada into one—to place on the nation-binding press a zone postal tax which would increase the postal charge upon national periodicals as high as 800 per cent. It means loss to you personally and a loss to your country. It will weaken, cripple and in some cases destroy Canadian national periodicals. You will be deprived of papers that have kept you informed on your country's problems, your business problems—that have helped you in your work. Such magazines as do survive will cost you much more.

The publishers are not trying to evade fair taxation. They will gladly accept any fair tax upon their profits.

But is it fair that you should be taxed out of getting journals, papers and magazines that have helped you build your business and in turn built the business of the country?

If you believe in national ideals and national periodicals, sign attached form.

Tear off and mail to-day

ELECTRICAL NEWS,
347 Adelaide Street West, Toronto, Ont.

I am opposed to any zone postal law which would mean charging higher subscription rates to subscribers, according to distance from office of publication.

Name ....

Address ....

The Contractor-Dealer

Shop Lighting—An Outline of the Requirements to Produce Maximum Production and Highest Factor of Safety—By Mr. Kenneth A. McIntyre, of Beattie, McIntyre, Ltd., Toronto, and President of the Ontario Electrical Contractors' Association.*

This paper, being presented before the Canadian National Safety League, should give prominence to the subject from the standpoint of safety engineering, but should not overlook it's importance in relation to production.

Many attempts have been made to determine the percentage of industrial accidents attributable to improper illumination. The estimates range from 23 per cent. upwards, and cannot be taken unqualifiedly inasmuch as it seems impossible to secure an accurate classification of this kind. Poor illumination is certainly directly responsible for a considerable percentage of such accidents and indirectly responsible to an even greater extent. This general statement is borne out by the results of the study of an insurance company's accident statistics for one year. The number of fatal accidents in the month of December and January proved to be 40 per cent. more than might reasonably be expected, were there the same number of daylight hours in winter, as in summer.

Under poor and improper lighting, an obstacle in the workman's path means tripping or falling with possibility of becoming caught in machinery. Ever since stairs have been invented, human beings have been prone to fall up or down, and poor illumination favors the habit even though a broken limb or a broken neck be the penalty. Presence of shadows is also blameworthy.

Accidents are caused indirectly by injurious effect of improper illumination on the eyes, resulting in impaired visual powers.

Further—for humanitarian reasons, the eyesight of employees should be conserved.

Physical Value of Good Lighting

The Postal Life Insurance Co., in its Health Bulletin No. 22 in 1918 states: "The visual faculty is life's most precious boon; yet from infancy to old age its wealth is squandered in ignorant and excessive use." "Among the agencies that work injury to the eyes, it is probable that our system of artificial lighting is the most destructive. The illumination in our homes, offices, stores, and factories is nearly always direct, concentrated and intense; whereas the most elementary science and knowledge of the laws of refraction teach that it should be indirect, diffused, and at least as mild as daylight." "But a vastly greater number of victims of defective lighting systems are those whose vision has become gradually impaired through an unconscious effort to accommodate the eye to the glare of an electric bulb in its vicinity. This growing weakness in the seeing power means reduced efficiency in every way."

Eye-strain is productive not only of headaches but of specific disorders of the system, as well as resulting in actual diseases of the eye with blindness frequently the consequence.

"The real test of illumination is the ability of the eye not only to discern details distinctly, but to continue the visual effort for a great length of time without eye strain and fatigue."

Factory output or production is stimulated and improved by good illumination in various ways:

1. Increase production for same cost.
2. Greater accuracy in workmanship with consequent reduction of spoilage.
3. Reduced accident hazard.
4. Avoidance or at least reduction in eye strain.
5. Surroundings made more cheerful.
6. Work performed with less fatigue.
7. Order, neatness and sanitation promoted.
8. Superintendence rendered more effective.

Such advantages are obvious and can be obtained through an annual expenditure of less than 1 per cent. of the pay roll. It is not difficult to realize many times over on the investment.

During the past few years perfectly good machinery has been scrapped without hesitation to make way for more efficient machinery in the endeavor to increase production and reduce its unit cost. We should not overlook the **need** of the **man in charge** of the machinery and to provide **him** with the very best working conditions. **He** is the vital factor.

Two Kinds of Illumination

Lighting is of two kinds—natural and artificial. The requirements for good lighting under both classes are much the same.

1. Sufficiency under all conditions.
2. Diffusion, i.e., the avoidance of glare and of extreme contrasts of light and shadow.
3. Maintenance to ensure the conditions contemplated in the proper design.

The architect or engineer, who is abreast of the times, gives, during the design of industrial structures, very careful consideration to the matter of natural lighting. Before passing to the subject of artificial lighting, the following points on natural lighting are worthy of mention:

1. Where no overtime operation is in effect 65 per cent. to 75 per cent. of the work is done by natural light.
2. Lighting codes require double intensity of natural lighting over artificial lighting because light coming to the eye in daylight from all the surroundings, is much brighter than at night. Thus a more intense light is required on the work.
3. Light should be adequate for each employee.
4. Windows should be so spaced and located that daylight conditions are fairly uniform over the working area.
5. Intensities of daylight should be such that artificial light will be required only during those portions of the day when it would naturally be considered necessary.
6. Quality of light should avoid glare due to sun's rays or light from the sky shining directly into the

---

* [illegible] First Annual Convention, Canadian National Safety League, April 13-15, [illegible]

eye. Window shades or awnings should be provided where necessary to this end.

7. Ceilings and upper portions of walls should be maintained a light color to increase effectiveness of lighting.
8. Among the special means for improving natural lighting may be mentioned saw-tooth roof construction, skylights, and the use of prismatic glass to redirect light into the working space.
9. Wire glass should be used as safeguard where there is danger of glass falling if broken.
10. Some factory laws require the use of clear glass in lower sections of windows to enable employees to exercise long range vision to retain that power.
11. Windows should be cleaned regularly at proper intervals.

Artificial Lighting

We now come to the subject of artificial illumination. Its importance has kept pace with the growth of modern industry but its proper consideration is only too generally neglected, yet 25 per cent. to 35 per cent. of work is performed under artificial light. Production often demands more than one working shift and even where this is not the case, adequate illumination must be continuous regardless of length or brightness of days. Because of limited time, electric lighting only will be discussed.

At the outset it is well to realize that the incandescent lamp in its present stage of development is many times more efficient than the lamps of ten or fifteen years ago, it is available in larger units and at reasonable prices. Its brilliancy has also greatly increased, which introduces a serious problem.

Artificial lighting must comply with the requirements for good illumination set forth earlier in this paper. Complete satisfaction cannot be obtained if one of them is neglected.

In considering illumination, measurements are made in units of intensity of illumination much as distances in feet or weight by pounds. The unit of intensity is known as the foot-candle and is the intensity of illumination produced on a surface one foot distant from a lamp of one candle power.

The Foot-Candle Meter

Measurements are made by means of an instrument called a photometer. A simplified form known as the "foot-candle meter" is in general use and is sufficiently accurate for practical purposes.

The first requirement is sufficiency. Intensity will be determined largely by the color and fineness of the materials in process of manufacture. Since an object is seen only by the light which it reflects, dark objects will require higher intensities as does also work requiring more accuracy.

The intensities must be sufficient whether working surfaces are in horizontal, oblique or vertical planes.

For an average value, intensities in a vertical plane will be approximately one-half those in a horizontal plane of the same installation.

Diffusion, the second requirement, avoids glare, which is defined as "Brightness within the field of view of such excessive character as to cause discomfort, annoyance or interference with vision." An exaggerated and familiar example of glare and its effects is met at night in attempting to drive on a highway under the spell of unprotected headlights approaching.

In problems of illumination the degree of glare depends upon six principal factors:—

1. Total candlepower emitted by the source in the direction of the eye;
2. Distance from the source to the eye;
3. Intrinsic brilliancy of the source;
4. Contrast in brightness between the light source and the working surfaces and surroundings;
5. Proximity of the light source to the line of vision;
6. Length of time during which the source of glare is present within the field of vision.

Specular Reflection

Another form of glare is so-called specular reflection, in which case the image of a bright light source is reflected from a highly polished surface. This is especially trying because it is necessary to keep the eyes directed towards such surfaces when working on them and the eyes by nature are much more sensitive to light rays entering from below.

The avoidance of extreme contrasts requires the illumination of surrounding surfaces as well. Thus the eye is not called upon constantly to change its adjustment from one extreme to the other. Aisles and passages for this reason must be well lighted.

The foregoing considerations lead to one conclusion—**general lighting from overhead.** It is thus possible to keep the light source somewhat above the line of vision and to secure uniform distribution by choice of proper reflectors correctly located as to mounting heights and spacing.

The use of drop lights should be avoided except when absolutely necessary because of very fine character of work or shadows cast by parts of machinery. The lamps should be covered from view by suitable reflectors.

Incandescent lamps are available in sizes 10 watt to 60 watt in vacuum type and 50 watt to 1000 watt in gas-filled type affording a wide field for choice to meet any condition. Their average life efficiency is within 6 per cent. of initial value.

Voltage fluctuations, if frequent and considerable, have a bad effect. Low voltage decreases candle power, over-voltage shortens lamp life. The lamp should be selected for the average voltage of the circuit. Light and power circuits should be kept separate if possible to minimize fluctuations of voltage. Copper sizes in wiring should be sufficient to keep voltage drop within 2 per cent.

Light emitted from incandescent lamps contains the colors of daylight and is not unpleasing to the eye. A type is available which approaches the color value of daylight.

Effect of Frequency

The effect of frequency in the use of alternating current for lighting has been a matter of investigation in order to determine the critical frequency below which it is unsafe to go, but it is difficult to define what constitutes objectionable flicker. Incandescent lamps are lease sensitive to low frequencies so far as flicker is concerned. For physical reasons, the smaller sizes up to 25 watts show a perceptible flicker on 25 cycle circuits, though in larger units, the flicker it not evident. Much of the annoyance displayed by some people must be due to suggestion and imagination. The case is cited of the man who worked for months under 25 cycle lighting without knowing it. Upon having the flicker called to his attention, he suddenly developed headaches and eye-strain. Flicker can seldom be observed by looking directly at the light source or at the plane of illumination. Due to the fact that the periphery of the retina is more sensitive to flicker than the centre flicker can be detected out of the corner of the eye by looking directly at an object to one side of the light source. In general, it may be stated that for factory lighting no difficulty will be encountered except for very fine work under small size lamps for local lighting.

Three methods of general lighting are available, direct, semi-indirect and total indirect. The two latter are more suitable for illumination of offices, stores and buildings other than factories. Being inverted, they accumulate dust under average factory conditions unless cleaned very frequently.

Since an unshaded lamp sends no more than half its light below the horizontal, it is necessary to make use of reflectors.

In considering reflectors for a direct lighting system, the size of lamps must be first decided according to intensity required, spacing and mounting heights, which factors are determined by dimensions and structure of the building.

Reflectors may be divided into the broad classes—

Extensive
Intensive
Focusing.

The former being used for moderate heights of mounting and the latter for greater mounting heights. In a brief paper, time does not suffice for sufficient detail of illumination design and the statements are therefore more or less in the form of an outline.

Reflectors of Various Materials

Reflectors may be obtained in these three styles but made of various materials, a list of which, with comments, follows:—

Porcelain Enamelled Steel—are strong, durable, reasonably efficient, reflecting surface does not deteriorate and can be easily cleaned, restoring to original condition.

Paint Enamelled Steel—should only be used for temporary work since they are usually of light gauge metal and surface deteriorates rapidly. Cleaning cannot altogether restore the surface to original condition.

Aluminized Steel—has almost gone out of use in favor of porcelain enamelled steel. Strong, but the surface when dirty can only be restored by refinishing.

Mirrored Glass—are breakable and require careful handling. Makes are available which show maximum efficiency over all other types of reflectors, the reflecting surfaces of which do not depreciate. Are opaque.

Prismatic Glass—are breakable and require careful handling. Designs are available which give excellent results and have the added advantage of permitting light to pleasantly illuminate the ceiling and other upper surfaces. The makers claim low depreciation due to dust accumulation because the refracting and reflecting prismatic surfaces are not affected.

Opal Glass—reflectors are not so efficient as prismatic glass but the same remarks apply. They give excellent diffusion.

An interesting development is a combination steel and glass reflector recently designed which permits a portion of the light to escape to the upper parts of a room.

It is important in using low mounting heights to either use bowl frosted lamps or to supply diffusing or reflecting caps over the tip of the lamps to hide the bright filament from view.

Lighting systems should be conveniently controlled by switches either local or in sectional cabinets. Circuits should run longitudinally so that central spaces can be lighted first as twilight approaches.

It is important to provide emergency lighting from a separate source if possible so that in case of failure of the main lighting and power system, employees in emergency are able to find exit.

Watchmen's circuits should be provided giving just sufficient light for safe vision in walking and to detect intruders.

Yard lighting should not be overlooked in the interest of safety. The need for stair and passageway lighting has already been mentioned.

Maintenance

Last but not least is the requirement of maintenance to ensure good lighting. According to a recent and comprehensive article the best practical method involves:—

1. The use of a depreciation factor, or factor of safety in the original design of the system to ensure adequate illumination when the system has depreciated a normal amount.

2. The cleaning of lighting units at frequent, regular intervals.

3. The replacement of lamps which have become blackened in service by abnormally long life.

4. The use of lamps at correct voltage rating for all replacements.

5. The refinishing of ceiling and walls at reasonable intervals.

This method should not stop with a knowledge of and a desire for it, but it should be organized as a regular part of the shop routine. Tests show that after a period of neglect, illumination can be increased anywhere from 25 per cent. to 100 per cent. by merely washing the units.

Lamps in use below rated voltage will show for each five volts below rated voltage a decrease in candle-power as follows:—

5 volts	15 per cent. loss
10 volts	29 per cent. loss
15 volts	41 per cent. loss

so this point is one we can ill afford to pass by.

Need for Education

The great need for education on the subject of factory illumination is forcibly illustrated by data recently gathered in 446 industrial plants by trained observers. 85 per cent. of the manufacturers interviewed were more or less satisfied with their present lighting conditions, and yet only 40 per cent. of the plants visited were adequately lighted. Better illumination was needed in 60 per cent. of them.

The intelligence of men interviewed on the subject was rated as

Intelligently informed	43.5 per cent.
Vaguely informed	36.4 per cent.
Not informed..	20.1 per cent.

A further astonishing disclosure shows that there were more plants burning bare lamps than there were plants with lamps entirely equipped with reflectors. Here is the call to Safety Organizations for an educational campaign for the benefit of employees' welfare and safety.

The educational efforts of the Illuminating Engineering Society and of Safety Organizations have already resulted in legislation in several states in the U. S.

The lighting codes thus made law are a logical step to follow in the path of industrial legislation. The requirements set forth in them are designed to protect the operators who must work for long hours under the conditions day after day. They are the very minimum consistent with consideration of the workers' health. They do not however, ensure the most economical production, for which result much higher intensities are necessary.

These codes are in force in California, Pennsylvania, New Jersey, New York, Ohio and Wisconsin. A partial table of the Wisconsin requirements for intensities is given herewith.

Extracts from Wisconsin Lighting Code

Order 2112—Artificial Light

When the natural light is less than twice the minimum permissible intensities of illumination set forth in the following table. The intensities of recommended practice indicate the desirable illumination for best working conditions.

Illumination Intensity at the Work in Foot Candles

	Minimum Permissible Intensity	Ordinary Practice
(a) Roadways and yard thoroughfares	0.02	0.05-0.25

(b) Storage spaces 0.25	0.5 -1.0	
(c) Stairways, passageways, aisles 0.25	0.75-2.0	
(d) Toilets and washrooms 0.5	1.5 -3.0	
(e) Rough manufacturing, such as rough machining, rough assembling, rough bench work, foundry floor work 1.25	2.0 -4.0	
(f) Rough manufacturing involving closer discrimination of detail 2.0	3.0 -6.0	
(g) Fine manufacturing such as fine lathe work, pattern and tool making, light colored textiles 3.0	4.0 -8.0	
(h) Special cases of fine work, such as watchmaking engraving, drafting, dark colored textiles 5.0	10.0 -15.0	
(i) Office work, such as accounting, typewriting, etc. 3.0	4.0 -8.0	

Note:—The measurements of illumination are to be made at the work with a properly standardized portable photometer.

The minimum foot-candles specify the lowest illumination intensity with which the employees can be expected to work with safety when artificial light is used. It is to the advantage of the employers to provide the intensities of the ordinary practice, as this results in less eye strain, greater accuracy of workmanship, increased production for the same labor cost and less spoilage. When part daylight and part artificial illumination is used, it is desirable to use even higher intensities than those of ordinary practice in the table above. (See note accompanying Order 2111).

In order that the illumination intensities shall never fall below the minimum during the interval between inspections, installations should be designed to produce initial values at least 25 per cent. higher.

Note that measurements are taken at the work regardless of its position whether in a horizontal, oblique or vertical plane.

In conclusion it should be realized that the science of illumination has made tremendous strides in the past few years. The installation of more than five years which has not been properly revamped during that period is now obsolete. The design of a modern, efficient and satisfactory system of lighting is no hit and miss proposition but requires the services and best thought of an expert.

Needs in Canada

Surely in all the provinces of Canada to-day there is the most glaring need for education and legislation to abolish the evils of harmful illumination and to bring to the aid of Canadian Industry in its forward march the powerful ally of good shop lighting.

For certain information contained in this paper acknowledgement is made to the following sources:

Transactions of the Illuminating Engineering; Transactions A.I.E.E.; Works of C. E. Clewell Industrial Commission of Wisconsin; Publications of National Lamp Works of General Electric Co.; Electrical World; General Electric Review; Lectures before University of Pennsylvania under auspices of Illuminating Engineering Society; G. H. Stickney.

Make Use of the Front of the Counter for Display

A contractor dealer could not afford a second showcase in his store although he had plenty of room for it. He had, however, a counter which was of no value to him for display purposes. He finally hit upon the plan of cutting out a piece of the front of the counter and replacing it by a sheet of glass. The piece removed was about 2 ft. 6 in. by 15 in. Behind this he fixed a box which he lined neatly and in the two top front corners installed a small electric light In the small showcase thus made he placed flashlights of various kinds. The whole equipment was inexpensive and instead of a dead useless counter front he had a useful and attractive little display.

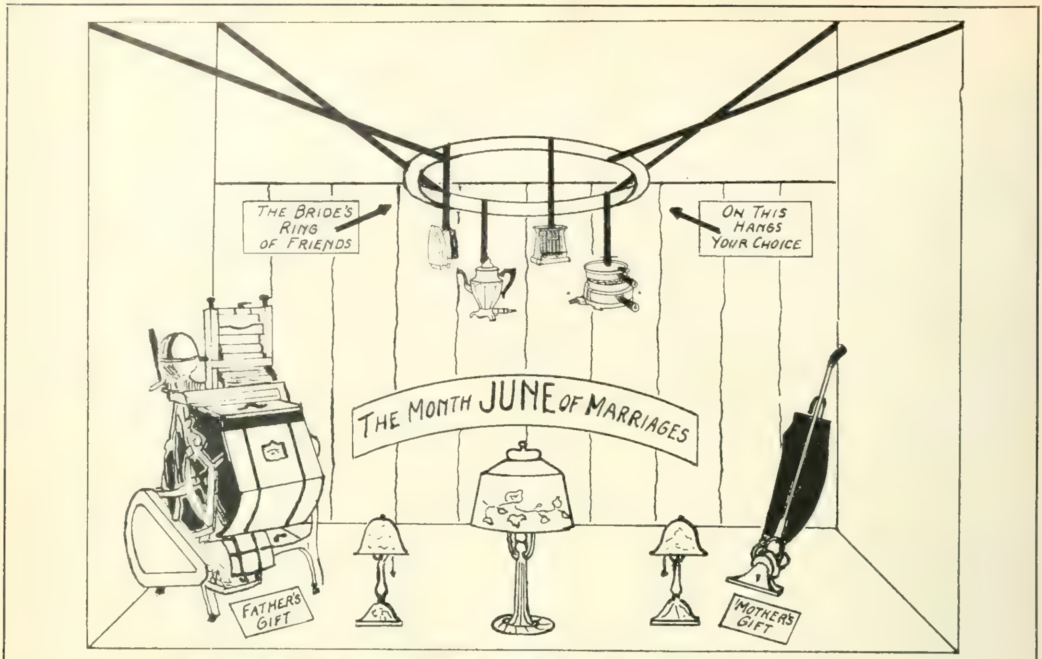
Electricans' License Act.

When the Electricians' License Bill was passed three years ago, providing that all electrical work in Manitoba should be performed by journeymen electricians holding a license under the act, this branch arranged that exception be made to cover repairs to plant equipment and clause No. 14 was added to the bill, providing that this work could be done by the chief engineer of the plant. Every session since that time an amendment has been introduced seeking to cancel this clause. In the amendment of the act this year concellation of clause 14 was again provided for. The electrical branch secured the co-operation of the Manitoba Employers' Association, the Winnipeg Board of Trade, and the Engineers' organization, and appeared before the Law Amendments Committee, with the result that clause 14 was allowed to remain in the act.

The Electric Hen

Not long ago there was a hen
Who burst into a cackle when
Somebody claimed electric light
Was used to boost more eggs in sight.
"Go on," said she, "such things can't be;
You guys are simply stringing me.
I am no foolish barn yard bird
And won't believe a single word.
I am a faithful girl and seek
To lay my four eggs every week.
But—here's my ultimatum: Nix!
I plumb refuse to make it six."
Now farmer Jones some time ago
Bought him a lighting dynamo
Which gave old Jones, the kids, the spouse
Town comforts in their country house.
One evening, when the hogs were fed
And Mrs. Jones had gone to bed
And Jones looked through the weekly paper,
He said, "By gosh this is some caper!
Gee whiz, by gum, also by heck—
Here's where the eggs come by the peck.
That there professor—what the duce!—
He lays eggs with electric juice!"
So farmer Jones and his big son
Did as Professor Rice had done;
And in a day the wily scamps
Had strung the coop with 'lectric lamps—
Right soon it was as plain as day,
Things went on in a different way,
The rooster felt an inward urging
To be a sport and do some splurging;
He was ambitious through and through,
The bets he missed were mighty few,
He labored with a vampish lust
To boost the egg supply or bust—
Till hens began to shake their legs
A-laying eggs and eggs and eggs
And Jones's dollar pile kept mounting
Till he lost track and quit the counting
The moral isn't very far
And plainer than most morals are.
I understand it now, don't you?
The wonders 'lectric light can do.

With acknowledgements to "Contact."


THE BRIDE'S RING OF FRIENDS
ON THIS HANGS YOUR CHOICE
THE MONTH JUNE OF MARRIAGES
FATHER'S GIFT
MOTHER'S GIFT

A suggestion for a June window—The ring should be gilded, confetti scattered over the floor, etc.

The Marriage Month Window Display

June the month of marriages will soon be here, and with it a splendid opportunity for electrical dealers to make big sales. Everyone has to go through the agony of choosing something as a gift for a friend about to be married. The dealer who helps to solve the problem for prospective gift buyers will be looked upon as a public benefactor.

The suggested window display in the sketch is an outline only. A certain amount of floral decoration is necessary to give it the right wedding 'touch.' The model wedding ring should be gilded over, with colored ribbons to suspend it from the ceiling. Confetti scattered over the floor will give added effect.

A Special Card has been sent out by the Organization Committee of the coming Great Co-operation Meeting to be held in Vancouver, B. C., May 31st & June 1st. On the address side of the card is printed:

WE WANT YOU AND YOUR WIFE

On the other side:

Contractors
Dealers
Central Station
Jobbers
Manufacturers
We are all partners in
this wonderful business
Each for all, and all for each.

COME

To the Great Co-operation Meeting, Vancouver, B. C., May 31st & June 1st.

Pulling Electricity's Fangs

"I don't mind housework any more. I've given up haunting employment agencies. It's easier to do the whole job alone than run down for new help every third week. The electric vacuum cleaner takes the backache out of sweeping. Jim does the washing or rather he puts the clothes in the tub and the machine does the work during the dinner hour on Monday. My new electric range is more reliable than any maid—the cooking is done while I'm playing bridge at the Jack's."

Ever hear that? That refrain is almost as common today as slang, and when you stop to consider the significance of the new electrical order of things, we take off our hats to this force, as powerful as Niagara and more flexible and adaptable than any other medium known. However, trite, isn't electricity the most wonderful fact of the present age? Isn't electricity the greatest material boon to mankind—and womankind—since time began?

Dealer Issuing a Folder

A new electrical store has been opened recently at 6-5 St. Clair Ave., Toronto, by Mr. J. H. Harris. He is distributing a very attractive little folder, the front of which shows two useful styles of ceiling fixtures, also the location of his store. Inside the folder is the announcement that he will stock a great variety of electrical fixtures of the latest design, and all kinds of appliances and supplies. In addition he announces that he will feature the installation of commercial lighting units. The back of the folder shows a living room with children round the table busy with their studies and the mother instructing one of the boys. A portable lamp gives light to their labors.

The "Welcome Home" Salesmen's Club

Friends Plan to Gather Round Eric Wood's Fireplace Every Week End and Swap Stories of Their Selling Experiences

The "Salesmen's Club" came into being as the result of a conversation between Eric Woods and Murray Sinclair, in the rotunda of the Empress Hotel at Peterboro. The club was composed of six members—three wholesale and three retail salesmen—and the rules of the club were that they should meet every Saturday evening, at the rooms of the members in turn. The membership was not to exceed eight. Part of each evening was to be given over to business and part to amusement. No fee was to be charged but a fine of twenty-five cents was to be paid by all absentees who could not give a legitimate excuse. The chairman of the evening was to be the host, and the secretary the host of the previous evening. A dinner was to be held annually to which each could invite one friend. Any fines collected during the year were to be used to help defray the expenses of the dinner. The balance was to be paid by a levy on the members.

The first regular meeting of the club was held at the rooms of Eric Woods. His sitting room boasted a fireplace and around the welcome glow of a wood fire gathered his five friends.

Eric Woods as chairman for the evening called the meeting to order and briefly outlined the plans of the club. Sinclair as the originator of the idea was called upon to give them a practical outline of what was in his mind when he suggested the scheme. Sinclair accepted the call, and the remainder got out their pipes and settled down to hear what he had to say.

"Well boys," he began, "I more than half expected to be called upon to give the first spiel. I am going to give you a brief account of one of the most pleasurable experiences in my life as a drummer."

There were murmurs of applause as Sinclair paused a moment to collect his thoughts. When all was silent again he began the following interesting story:

"Some years ago I was travelling for the firm of Blank & Co., of Montreal, manufacturers of the famous 'Easy' iron. Among the places I had to visit was the small town of Ashburton, in Northern Ontario. I had never been able to do much business there because the only store selling electrical goods was owned by Charles Rogers, a hardware man. He had always resented the installation of electricity in the town, and so, although practically forced to instal certain supplies, he had done nothing to push the sale of these articles. His stock was very poor, and consequently most of the people got what they wanted from a neighboring town. For two years I had tried my best to interest him into booming the 'Easy' and other appliances of the kind, but without success. The more I thought about the town and the business going begging the more I tried to think of some method to induce Rogers to buy.

Finally I decided that if anything was to be done in the matter it would have to be through some other source than the old hardware dealer. Then it was that I got the idea which I afterwards was able to carry out with success.

The thought came to me as I was talking to one of my customers in a town not many miles from Ashburton. A young fellow came into the store in which I was doing business at the time, and bought some wire. After he had left Clayton, my customer, told me that the young fellow's name was Harrison, and that he worked at the central station. He did odd jobs in the evenings and was a very enthusiastic and conscientious workman. I walked back to the hotel with the germ of the idea in my mind.

The next evening I called upon Harrison at his home, had a chat with him, and learned that his ambition was to open up a business of his own. I also met his wife, who appeared to be a charming woman and in no way likely to interfere with my plan.

On my return to Montreal I had a talk with my boss and explained to him fully what was in my mind. I persuaded him to give me permission to carry out the scheme as I had planned. Then I paid another visit to Harrison. It was necessary that someone, unknown to the townsfolk, should visit Ashburton and size up the situation. I persuaded Harrison to undertake the task and explained to him sufficient of the scheme to enable him to acquire the information needed.

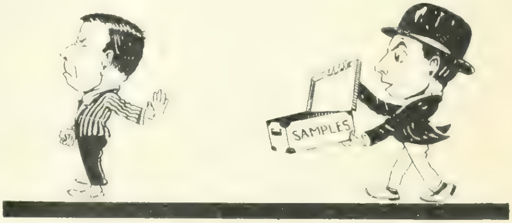
He went to Ashburton and as I anticipated came back enthusiastic over the possibilities for the opening of the store. Then I surprised him by suggesting that he be the one to open up in that town. I will give you as near as I can remember the conversation which followed this suggestion of mine. His first question was.

"Where is the money coming from? I have managed to save a little but not sufficient to stock a store. I can't expect to get credit until I have established a reputation, so that it seems to me your suggestion is absurd."

"Harrison," I said, "I have been visiting Rogers' store for two years now, and during that time have patiently tried to to get him to take a greater interest in the sale of electrical goods, but without success. My patience is exhausted and I have decided to teach the old fool a lesson, by showing him the opportunities he has missed all these years. To do this I must have the help of a man I can trust to be interested in the electrical game. I believe you to be the man and so knowing that you were not yet able to finance a business I had a talk with my boss and he will allow you credit on my recommendation. For some of the goods which we do not stock I have arranged with a friend, who is also a salesman for an electrical house, to call upon you and he will also give you credit."

"But why are you so interested in me? What can you hope to get out of it.?"

"Nothing but the satisfaction of proving a theory. Moreover I bind you to nothing. I believe our goods are



For Two Years I Had Tried My Best to Interest Him the best on the market, and ask only that you shall give them a fair trial."

"Well, I'll talk the matter over with my wife and give you my decision later."

"Good! I will be passing through the town in a week or so and will give you a call."

The next time I saw him he had decided to do what I wished and I immediately explained to him the plan in detail. He was to go down to Ashburton and lease a store which providentially for us was vacant. His next move was to arrange with a carpenter to make the necessary alterations to the interior of the store. Announcement of the time of opening was to be made through the local paper. He was to tell no one of the kind of merchandise he would sell. While this was being done I arranged for him to visit the factory and between us we chose a suitable line of appliances and supplies. All goods were to be shipped without any identification, as to contents, upon the boxes in which they were packed. Finally when he dressed his store he was to take care that no one could see what goods he was handling.

All this he carried out faithfully, and from time to time sent other advertisements to the paper, always keeping the secret.

You can guess the excitement this secrecy caused, and I am free to say that never before had the inhabitants of Ashburton been so curious. Many amusing attempts were made to find out the truth but with no success. Harrison had advertised that he would give a six dollar article to the first three persons buying at his store.

The great day arrived and I was there to see the fun. Ashburton's police force was on hand in full strength—one policeman and the chief. And the crowd, ye gods! The Pied Piper of Hamelin was a back number when it came to drawing crowds. Every citizen who could walk was there, I believe. I was in the back room when the doors were opened and the first three people admitted. They were ladies and hadn't the faintest idea what to buy. They eventually made a purchase, and were each presented with a six dollar iron. Then Harrison showed them around the store and told them of his hopes for the future, at the same time asking them to speak a word for him to their friends. This they promised willingly enough, and three tired but happy persons left the store. Then began an interesting day. The people took the whole thing in the right spirit and cheered the stranger who had kept them in such complete ignorance for several weeks, and settled amongst them to provide what none of their own townsfolk had dared to attempt.

I took a stroll to Rogers' store, and if you had seen the old boy raging, as I saw him, you would really understand how hard he had been hit. I never sold him another article for he guessed that I was behind the scheme and refused to give me another order.

"Did he quit selling electrical goods?" asked Stewart.

"No fear he didn't. He got busy, cleaned up his store a little and laid in a better stock of fixtures. But it made no difference to Harrison's sales. The people realized that he was a man with ideas and backed him up. Then, too, competition was good for him. Since then the town has grown greatly, and Harrison is as alive as ever and quite as willing to accept advice."

"Well, old man," said Norton, "that was a cracking good yarn. I wish I could dream like that."

There was a temporary scuffle between the two friends and after it was over the boys settled down to a real enjoyment of the remainder of the evening.

Theodore N. Vail, chairman of the American Telephone and Telegraph Company, died recently in Johns Hopkins Hospital, Baltimore.

The Story of a Grill—As Told by Itself

The first thing I remember, was being taken out of a mine and called ore. I shan't bother to tell all that happened to me between that time and the moment I was placed on a shelf along with several of my relatives, in the warehouse of the factory in which I was fashioned to my present shape. It was a painful time, but as I look at myself now with all my shining appearance and know that I am of use in the world, I feel that it was worth it.

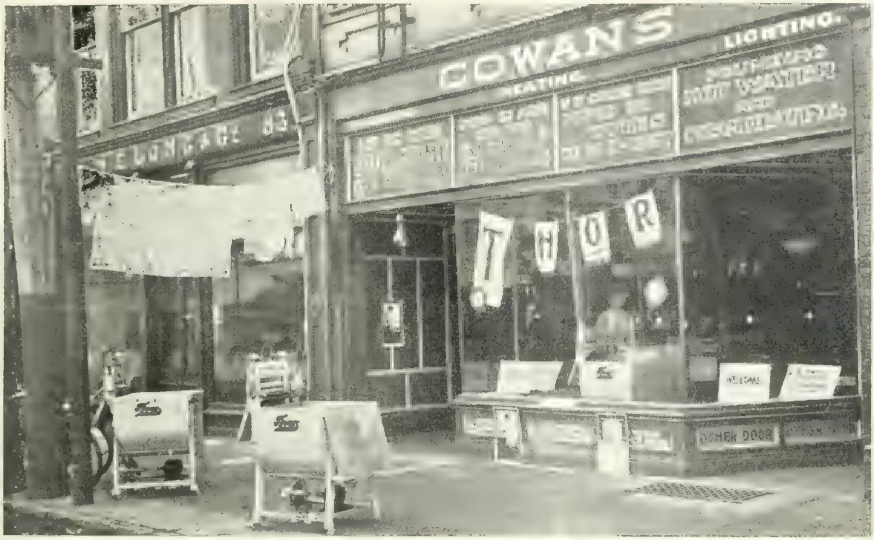
Eventually I was packed up in a box and shipped to a building called a store. I was taken out of the box by my new master, cleaned up and then put in a glass case where I could 'show off' to my heart's content. Occasionally I was taken out of the case and shown to people. Sometimes I was admired and sometimes criticized, but my master always appeared pleased and spoke just as kindly and calmly to all who looked at me, telling them of the things I could do. As he put me back in the case he usually said to me "Better luck next time." Finally a young lady came into the store and asked to see me. I was taken from the case and the storekeeper spoke about me in the usual way. The young lady looked me all over and asked a few questions, and in the end said "All right, I'll take it." Later in the day I was packed in my box again and taken to the home of this lady. When she unpacked me, there was a young man present and I soon learned that they were but recently married. They were living in two rooms and had to take their meals in a restaurant. They did not like this and wanted to have their evening meal at home, and so bought me to help them do this. What good times we had together after that. They liked me so much that after a short time they began to have breakfast at home as well, and have continued to do so ever since. Sometimes I am used to make toast and grill bacon. I boil water for them and fry or boil potatoes, and if they wish it, roast the potatoes. I can cook all kinds of meat providing it is not too large a piece. If they want eggs I can cook them in almost every known form. Sometimes it is soup they want, or chowder, but it's all the same to me. Welsh rarebit I can turn out splendidly, and maccaroni and cheese I cook with ease. There are lots of other dishes which they concoct from time to time all of which I am able to help them with. I have a good home and do not wish to change it. I am treated well, cleaned thoroughly after being used, and in every way appreciated.

One day a lady came to see my mistress and she asked all about me. I heard my mistress say that I was very valuable to her and "was worth my weight in gold." Amongst other things she told the lady, was the fact that I could be regulated to give four different heats.

I have now been at this place for a year. I have never once failed to do what was set me to do and feel quite fit for many more years of work.

Twenty-Five Years' Progress

At the dinner of the Hamilton Electrical Association, held at the Royal Connaught Hotel on Tuesday evening, April 20th, R. M. Dewhurst, of the Standard Underground Cable Company, presided. The speaker of the occasion was Louis W. Pratt, sales manager of the Dominion Power and Transmission Company, whose theme was "Twenty-five Years' Progress in Electrical Industry."



Stretched the clothes line across the sidewalk so folks could see it coming both ways

Cowans, of Brantford, Put on a Selling Campaign in Washing Machines

Cowans, of Brantford, recently put on an interesting washing machine show for the benefit of the housewives of that city, which aroused more than usual interest and, incidentally, sold more than the usual amount of electric washing machines. To bring home to their customers the very practical features of the demonstration, a clothes line was strung from the outside of the store across the sidewalk to a telephone pole, and as soon as the first lot of clothes had been washed with the "Thor," these were hung on a line where everyone on the street, passing up or down must observe them. A shorter line, hung inside the window close to the glass, accommodated four towels, one long one with a large "T" and three smaller ones, with the letters "H", "O", "R". This is shown very distinctly in the photograph herewith. Out on the sidewalk were placed two new machines with some booklets, so that people who hesitated to enter the store might carry off the booklets and have a chance to think upon the benefits of an electric washing machine. In the window one of the machines was being operated with water, soap and clothes in it and attractive window cards were placed at strategic points. In the back of the room, however, the actual washing was taking place. A skilled demonstrator was in charge, showing everyone just how the machine operated, how well it dried the clothes and how clean they were being washed. A supply of dirty clothes was kept on the floor so that people could see for themselves that the clothing was really dirty when placed in the machine.

This campaign was conducted for one week only, but by keeping it alive and interesting, the company reports that they had much better results than in previous campaigns of two or three weeks. The idea underlying their success was that people acted quickly because the economic value of the machine was so strongly impressed upon them that the money value became a secondary consideration. The value of a quick turn-over can also be readily realized, in that every machine placed in a home, immediately becomes a factor in the sale of others in that vicinity.

In addition to the demonstration, a series of good, live letters were sent out from the head office to all prospective customers, and telephone calls, as far as possible, were made on the more likely prospects. It was impressed upon the people that the demontrations were not merely to sell machines, but to show how well and how efficiently housewives could do their own washing in these days of servant shortage. Half page advertisements were carried in a local paper describing the campaign and giving reasons why the townspeople should come and witness the demonstrations.

Window Backgrounds

What kind of a background shall I have to my window is the question a dealer often asks himself. Shall it be an open or closed window? Or shall I compromise and have a background about the height of the eyes?

One long established electrical store in Vancouver has decided that after many years of the open style it is not satisfactory and has changed over to the closed style. Their scheme is rather novel and well worth consideration. It is composed of a white hollywood background with three interchangeable panels. There are three sets of these panels made all of a different design. The panels are made of beaver board and decorated, sometimes with tinted kalsomine, sometimes with cretonne or velvet. Every two weeks the panels are changed and thus the window never becomes monotonous owing to the sameness of the background

More Power at Twin Falls

Completion of a new power plant at Twin Falls, which will furnish an additional 25,000 h.p., has been arranged for by the Abitibi Pulp & Paper Co., according to a recent report. It is expected that all of this construction will be completed by December 31, 1920, and the additional product available for sale during the year 1921.

Get in Touch with the Home-Builder

The birds have returned after their sojourn in the south, and they are building their homes. They pick the very best material for their nest and line it with care. But birds are not the only home-builders at this time of the year. Many young people are planning to get married and are looking about for a home. Some are building their own home; and these are the people of special interest to the contractor-dealer. The contractor-dealer has experience and the young people have ideas. Sometimes they will clash when they get together, but good cannot fail to result from their coming together. The young people will benefit by the experience of the dealer, and the dealer will get pointers for future sales talks.

Some dealers make a specialty of getting in touch with young home-builders. They send letters to all young people whose engagement is announced in the papers, and arrange for an interview. Two of the points emphasized by one dealer are:

1. Sooner or later you will realize the value of modern labor saving appliances, and it is better to have convenient outlets installed in your new home while it is being built than wait until all is completed, when to have them installed will be more expensive, besides causing extra cleaning for your wife.

2. It is in the evenings when the lights are on that decorations are most conspicuous. It is for your comfort and the satisfaction of the artistic within you, that you should consider the buying of fixtures which will not clash with the wallpaper and other interior decorations.

A specially designed pamphlet with brief pointed selling points will be effectual with some, while with others a personal letter will make the greater appeal.

Mr. M. W. Andrew Leaving Canada

Mr. M. W. Andrew and Mr. A. C. MacKay were guests at a little luncheon in the Mossop on April 9th at which Mr. Kenneth A McIntyre and the other officers of the Toronto Electrical Contractors' Association were hosts. Mr. Andrew is resigning the secretaryships of the manufacturers,' jobbers' and contractors' associations to take up other work in New York, and Mr. MacKay has been appointed to carry on. Some very flattering and well deserved remarks were made by the various members of the executive regarding Mr. Andrew's work and general regret expressed that he should have decided to leave Canada. Mr. MacKay in his turn received a warm welcome. The other members of the executive present were Messrs. R. A. L. Gray, Harry Rooks, Harry Hicks, E. A. Drury, J. Everard Myers and E. F. W. Salisbury.

Come In and Do Your Washing, Free

A free laundry, where anyone may come to do washing, is a notable enterprise undertaken by the Domestic Appliance Company of Oakland, Cal. A commodious room adjoining the Domestic Electric Appliance Company's sales room at 1533 Clay Street, has been rented and converted into a complete and thoroughly modern laundry plant. It is equipped with every up-to-date mechanical and electrical device which may be employed in facilitating laundry work and all appliances are so arranged to afford the utmost convenience for the operators. There are electric washing machines, electric drying machines, electric mangles, electric irons and ironing boards. In addition to furnishing the complete mechanical equipment, the Domestic Electric Appliance Company supplies the electricity, gas, hot water and [illegible] all [illegible] An intelligent courteous attendant instructs those who are unfamiliar with the workings of the various mechanical electrical devices in the operation of the appliances. The Domestic Electric Appliance Company cordially invites every one who has experienced any difficulty in having their laundry work performed to take advantage of this extraordinary opportunity.

A western contractor says:—"I am beginning to give up hope that we shall ever get our customers (I refer only to some of them) to see that if they lose one job another will soon come along, and they will get their share of the work that is going. There lies the secret of our trouble—the contractor hates to see a job go and so he skins it to the very edge, and if any unforseen expense occurs down he goes with the wreck."

Clearing House for Old Materials

The Toronto Contractors' Association have established a "Clearing House" for equipment—used or new—which the members are willing to dispose of. One of the members is named to receive lists of "Material for Sale" from the other members, arrange it in logical order, have lists printed and distribute them to all the members. In this way much material in the way of odds and ends has found a ready sale. This exchange is not only proving profitable but is helping to meet the shortage which exists in so many lines to-day. Mr. E. F. W. Salisbury, 615 Yonge St., is the present "Clearing House" and all electrical contractors are invited to communicate with him if they have any old stock for sale.

The Toronto Association of Electrical Contractors will hold their regular monthly meeting on Thursday evening, May 6th.

A circular issued by the Winnipeg Electric Railway Company announcing the issue of $3,000,000 of new 7 per cent. preferred stock states: "The reason for the issue of this stock is that the company desires to clear up its floating indebtedness, amounting to approximately $3,000,000, and not materially increase its interest charges.

23 YEARS

On April 17th, 1897, R. A. L. Gray started "on his own." He was "the whole works"—salesman, electrician and bookkeeper.

To-day we are among the largest Electrical Contractor-Dealers in Toronto.

We owe our success to the customers whom we have furnished with good materials, good workmanship and a square deal all through.

You, too, can depend on us, whether it be a little repair job or a big factory installation.

R.A.L. GRAY & CO.
ELECTRICAL ENGINEERS
85 YORK STREET
Just Below King St.
Telephone Adelaide 1475

Advertisement in Globe's Electrical Page, April 17. Many happy returns

Quebec will License Electrical Contractors

Legislature Working with Contractors Association and Will Have Important Changes Made in the Present Act

The Lieutenant-Governor in Council of the Province of Quebec has approved of the following regulations respecting the protection of public buildings against fire:

Instalment of Electricity and Heating Systems

Article 1.—Plans for all new electrical installations, either for lighting, for heating, or supplying motive power, as well as those for any heating system installed in public buildings as defined by Article 3749 of the Revised Statutes, 1909, must be submitted for approval to the chief inspector of industrial establishments in public buildings, as well as to the examiners appointed for that purpose.

Article 2.—Except in the cases hereinafter provided, no person or company, shall, after January 1, 1919, do business, undertake, or work to install wires, lines and apparatus for the transmission of electricity in order to produce light, heat or motive power in any province of Quebec, either as a contractor, or as a journeyman electrician unless the said person, or company has procured a license from the examiners appointed for that purpose.

Examiners

Article 3.—There shall be appointed a board of examiners, composed of three members, who must be electricians with a diploma, at least 25 years old, and having had at least five years' experience as journeyman electricians. Besides they must be able to speak and write the English and French languages correctly.

The duties of these officers shall be as follows:

1. To examine all plans of electrical and heating installations submitted to them in future;
2. To hold examinations for those wishing to become electricians, to grant certificates of competency, and to issue licenses;
3. To hold examinations in whatever places the Minister of Public Woeks and Labor shall decide; to draft a program of subjects for the examinations, to draft forms and other papers for examination purposes. They may collect fees, keep registers, and facilitate as much as possible the work of the inspectors. They shall keep in the archives of their office a copy of each license and of each certificate granted by them; to prepare reports on the operations of their office as often as they will be required to do so by the Minister or Deputy Minister.

Certificates and Licenses

Article 4.—Five different kinds of licenses shall be issued designed as follows.

License A.—May be issued to every person who shall have passed in a satisfactory manner the examination required of a journeyman electrician, who has filed a request for inscription as contractor or master electrician with the board of examiners and who has paid the fee prescribed by the present regulation.

License B.—May be granted to any company, association, corporation or firm, doing business or wishing to do business as contractors for electrical installation, provided one of the members of the said association, company, corporation or firm, or at least a person in their employ is the bearer of a proper certificate of journeyman electrician issued by the examiners and provided the fee for the license has been paid.

License C.—Is that granted to a journeyman electrician with at least five years' experience, who, after having successfully passed his examination, and after acting in conformity with the prescriptions in the forms prepared by the examiners, pays the fee prescribed by the present regulation.

License E.—Is the special license authorizing a person having a knowledge of electricity, and employed in a public building or edifice to do repairs and maintenance work in connection with the electrical installation in the said public or edifice.

The applicant for a special license must pass an examination before the board of examiners.

Article 5.—No apprentice or laborer and no other person not a bearer of the certificate of competence shall have the right to install electricity, except as an assistant under the immediate direction of a licensed journeyman electrician.

Article 6.—A company, association or person, whose principal place of business is situated outside of the province of Quebec, and wishing to undertake or complete electrical work as defined by the terms of the law shall come before the board of examiners and obtain a temporary license, allowing him to work during the time required to complete his undertaking. Such license shall expire as soon as the work is done.

Article 7.—No certificate or license issued under the law and regulations may be transferred or given away, and the said licenses and certificates may be suspended or cancelled by the board of examiners for reasons deemed sufficient. However, this suspension or cancellation is subject to appeal to the Minister of Public Works, or the Deputy Minister, and their decision shall be final.

Article 8.—Licenses issued to companies or contractors for the installation of electricity shall be posted in the offices of the said contractors or companies, and every journeyman electrician, cinematograph machine operator, or every bearer of a special license must always carry a copy of his certificate with him. Any omission to post the license or to carry the certificate as required by the regulations shall be deemed "prima facie" evidence of lack of qualification.

Article 9.—Proof that a contractor, company, corporation or association employs a non-licensed person to install electricity, or that the said installation is not made according to the regulations established for that purpose, or that he license was obtained by means of false representations, shall be considered sufficient reason to cancel the license of such contractor, company, corporation or association.

Article 10.—Certificates shall be issued for the year, and shall be renewed annually between the 1st and 15th of May of each year.

Licenses for contractors, companies, corporations or associations may be issued at any time, subject to a ten days' notice to the examiners.

Article 11.—Every corporation, association, company firm or contractor for installing electricity for lighting or heating purposes, or for motive power, shall pay a fee of $25.00 per year for its license.

For a so-called temporary license, an annual fee of $50.00 shall be paid to the board of examiners.

For every certificate of examination issued by the examiners for journeyman electricians a fee of $5.00 a year shall be paid, and a sum of $2.00 shall be paid for each renewal.

Article 12.—The act and the regulations in connection with it do not affect the work in electrical stations, or their branches, where electric power is generated either by a public service corporation, or by municipal departments, when the work is done by employees under the control and direction of the officers of the said corporations or municipal services, except, however, in the part of the said edifices in which the public, other than employees, is allowed to enter and is admitted.

Telephone and telegraph installations which are supplied with electricity by primary batteries, locomotives, cars and tramway systems, and the installation of lamps and lights in private homes and the preparing and adjusting of carbon in arc lights, are also excluded from the effect of the Act and Regulations.

Article 13.—Any person wanting a certificate either as a journeyman electrician, cinematograph machine operator, special operator, and every one in charge of hoisting machines in the capacity of electrician, shall forward a request to the board of examiners on a blank form given to him for that purpose. He shall be required to give information on the length of time he has been in the position he occupies, and also supply the board of examiners with sufficient information as to his behaviour and sobriety.

Article 14.—The National Electrical Code shall be used as a foundation for the preparation of the examination program as well as the form and interrogatories which the examiners use for the examination of would-be electricians.

The examiners may require from the candidates a demonstration practical as much as theoretical on the installation of electric power in edifices subject to the Act.

Article 15.—Any stationary engineer, bearer of a first or second class diploma, shall be allowed to work on improvements and repairing of electrical apparatus, but only in the factories or work shops in which he is regularly employed.

Article 16.—All firms, companies, corporations and any other persons, who undertakes electrical work for the production of light, heat and motive power without license and not under the supervision of an electrician with a diploma required by the act and regulations are liable to the penalties provided by article 3782 of the Act respecting public buildings.

Article 17.—Any journeyman electrician, any cinematograph machine operator, as well as any person in charge of repairs or maintenance work in the buildings mentioned by the Act, comprised under the name of special license (e) as well as any person working electric machines mentioned in the schedule annexed to the regulations who neglects or refuses to pass the examinations before the examiners, or who, not having the certificate required by the act and regulations, undertakes electrical work, either in connection with the installment of wires or electrical apparatus, or in connection with the operating of electrical apparatus mentioned in the schedule, shall be liable to the penalty provided by article 3782 of the act respecting public buildings in the province of Quebec.

The Electrical Contractors' Association of Montreal have had these regulations under consideration, and on April 19th, a deputation waited on Mr. L. Guyon, Deputy Minister of Labor for the Province, regarding the above regulations. The deputation pointed out that so far as these regulations were concerned they were instructed to urge that the terms "public buildings" be withdrawn, and that the word "buildings" alone be used, so that all classes of buildings should be effectively reached. As the meaning attached to a "public building" for the Province of Quebec extended all the way from churches and hospitals to stores and boarding houses, it was pointed out that especially in Montreal, a building might be a public one to-day and a private one to-morrow. A uniform method of inspection applicable to all buildings was necessary.

It was further urged that article 6 of the regulations should be so formed that foreign firms carrying out electrical contracts in the Province of Quebec should be required to pay a greater license fee than that to be exacted from firms whose headquarters are in the other provinces of Canada

A possible conflict of authority was pointed out as between certificates issued by the Underwriters' Inspection Bureau, and those issued by the Provincial authority.

The Deputy Minister, in reply, stated that certain alterations have been drafted by the Board of Examiners, and that these would be referred to the Electrical Contractors' Association. Another joint meeting would then be arranged, and if both parties agreed to amendments which they deemed necessary, an application would be made at the next session of the Provincial legislature to have these changes incorporated in the present regulations.

The deputation was composed of Messrs. Moncel, Shaw, Simoneau, St. Amour and Tremblay, of the Electrical Contractors' Association; Messrs. Mochon and Walsh, of the Board of Electrical Examiners, and Mr. David K. Trotter, general secretary of the Builders' Exchange.

Never Neglect An Opportunity to Advertise

There are innumerable ways of advertising, not on the schedule of advertising methods, which a wide-awake dealer can use to advantage. Following, are a few which dealers have used with good effect:

On a vacant lot opposite to a furniture store in one town was a large block of cement on which the furniture dealer painted the sign "Easier seats across the street." He made special window displays to co-operate with the sign.

Another dealer capitalized his broken window by having a show card printed bearing the following:

"We simply can't keep them out. People are so anxious to buy our Electrical Goods that they fight to get in through the window."

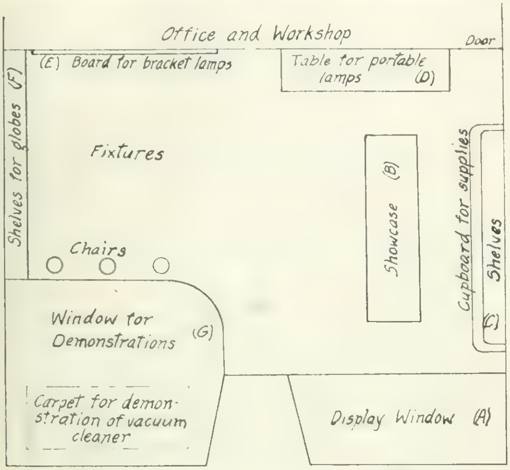
The scratch pad, which is always made good use of, has been used with success by many dealers to advertise their business. Every page bears the name and address, with phone number, of the dealer, and these are distributed to customers, especially chance ones. To send them to business men who are not customers will often be the means of making them customers.

It is surprising how few business men keep track of business houses and stores which have no connection with their own business. Often they find themselves needing a plumber or electrician and can't remember where to locate one. To help the business man out of his difficulty and at the same time advertise yourself at little expense is not a very difficult matter. One suggestion is to have cards, about 12 in. x 6 in., printed and mailed to the business men of the town. On the card list one of every important trade, with your own name printed in large black capitals. Give name, business, business address, and phone number. Part of the card can be devoted to advertising special lines carried in your own store.

Anything which brings your business before the public providing it is not an offence against good taste and the law, is legitimate.

A Suggested Layout for Medium Sized Store

The accompanying sketch shows a plan recently worked out for a store with a twenty-four feet frontage. Twenty feet of the depth of the store is partioned off for sales purposes and the remainder is utilized for office and workshop. The right-hand window is used for display, the floor of which is raised from the floor of the store. The left-hand window is a combined window display and demonstration room, for washers, vacuum cleaners, etc. There is no raised floor in this window and the only partition is a curtain four feet high. Ceiling fixtures are displayed in the portion behind the demonstration window.


Office and Workshop
Door
(E) Board for bracket lamps
Table for portable lamps (D)
Shelves for globes (F)
Fixtures
Chairs
Showcase (B)
Cupboard for supplies
Shelves
(C)
Window for Demonstrations (G)
Carpet for demonstration of vacuum cleaner
Display Window (A)

The dimensions are as follows:—

A. 9 ft. x 5 ft. front. 10 ft. 6 in. long, back.
B. 9 ft. x 2 ft. 6 in. or 2 cases 4 ft. 6 in. long.
C. 11 ft. x 1 ft. 6 in.
D. 8 ft. x 2 ft.
E. 9 ft.
F. 11 ft. x 1 ft.
G 9 ft. x 9 ft. 10 ft. 6 in. at widest point.

From.

A to B. 2 ft. 6 in.
B. to C. 2 ft. 6 in.

The table is constructed in the form of a case with glass sliding doors and is used both to display small lamps. A few chairs placed in the fixtures department provide comfort for customers.

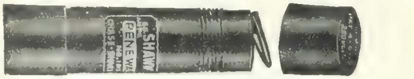
Montreal Exhibition During Summer

An Electrical and Home Welfare Exhibition will be held in the Motordrome, Sherbrooke Street East, Montreal, during the early part of the summer. The exhibition will be under the management of Mr. Victor Levesque, who managed the Auto Show recently held in Montreal. Plans have already been drawn showing the general layout of the booths and of the decorative scheme. One floor will be devoted to technical appliances, and two other floors to the home welfare section.

The Canadian Krantz Electric & Mfg. Co., Ltd., have issued Catalog 12A, describing Krantz safety apparatus, panel boards, switches, etc. This equipment is carried in stock by Mr. R. H. Nesbitt, 98 King St. E., Toronto.

Shawmut Renewable Fuse Approved

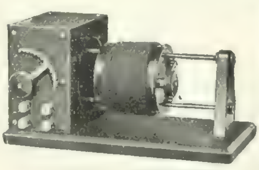
The Northern Electric Company, Limited, announce that the Northern Electric Shawmut renewable fuses have been approved by the Underwriters Laboratories. In the design of these fuses the number of parts has been reduced to a minimum in order to make the work of refilling as simple as possible. No mechanical or technical experience is necessary, the one tool needed is a screwdriver, and this for the larger sizes only. Particular attention is directed to the construction of the ferrule style of fuses. By a special form of snap washer the fusible element is firmly held at both ends between two flat metal faces, and when the ferrules are screwed on, each assembly is jammed to a positive mechanical contact. This contact it should be noted, is made between the washer and an inner metal end cap. All threads are metal to metal. The design of the knife blade type is such that accurate centering and positive end locking are secured. A minimum of parts and the self-evident manner of assembling them makes this a very simple fuse to refill. In the design of these fuses care has been taken to provide more than ample strength to withstand the forces released at the instant of blowing, and the Northern Electric Shawmut renewable line may be depended upon to operate safely under the severest service conditions. During the period of laboratory experiment the engineers subjected these fuses to the hardest tests which it is possible to produce, and from the experience thus gained the present construction has been developed.



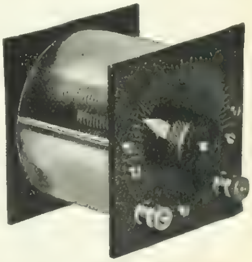
Amateur Wireless Sets

R. E. T. Pringle, Ltd., are the Canadian distributors of the amateur wireless sets manufactured by the Signal Electric Mfg. Co., of Menominee, Mich.

The R-32 short wave signal receiving transformer is designed for use on amateur aerials from 150 to 200 m. fundamental length, and with a small capacity variable condenser across the secondary will easily tune 600 m. There are two types of signal variable condensers: the 43 plate with a capacity of .001 mfd. and the 21 plate with a capacity of .0005 mfd. R. E. T. Pringle are distributing a bulletin containing full description of these "sets."



Transformer (short wave)
No. R-32 Signal Receiving



Signal Variable Condenser

The Roller-Smith Company, 233 Broadway, New York City, announces the removal of their Cleveland office from the Williamson Bldg. to the Vickers Bldg. The Cleveland office will continue to be in charge of Mr. J. E. Wood, district manager.

Current News and Notes

Halifax, N. S.

The Canadian General Electric Co., Hollis St., Halifax, N. S., have been awarded the contract to supply electric generators for the power development at St. Margaret's Bay, N. S.

Moncton, N. B.

The Thos. Johnson Co., Ltd., Main St., Moncton, has been awarded the contract for electrical work on stores and offices, Main and Lutz Sts., Moncton.

Tenders were called on April 15th, for electrical work on a new theatre to be built at the corner of Main and Oak Sts., Moncton, N. B. Plans and specifications can be obtained from the owners, the Eastern Amusement Co., and the architect, Mr. R. A. Frechette, 30 Bonacord St., Moncton.

Toronto, Ont.

Messrs. J. Devonshire, Ltd., 701 Yonge St., Toronto, have been awarded the contract for electric wiring in the factory of the American La France Fire Engine Co. of Canada, Ltd., Toronto.

Tenders will be let for electrical work on a new building being erected by the Photo Engravers, Ltd., at the corner of Spadina Ave. and Grange St., Toronto. The Manager is Mr. Northgrave, at 70 Bond St., Toronto.

Tenders are wanted for electrical work on new church at Mt. Dennis, Ont. The architects are Messrs S. B. Coon & Son, 810 Excelsior Life Bldg., Toronto.

Calgary, Alta.

Tenders will be received by Messrs. Major & Stacy-Judd, architects, 231-8th Ave. W., Calgary, Alta., for electric wiring, fixtures, ranges and vacuum cleaner. These are to be installed in new apartment block at Calgary.

The Empire Hotel Go., Calgary, are building a new hotel at Calgary and are calling for tenders for electric wiring. Architects, Major & Stacy-Judd, 231-8th Ave. W., Calgary, Alta.

Hamilton, Ont.

Extensive alterations are being made on the store of Messrs. G. W. Robinson Co., Ltd., 26 James St. S. The general contractors, W. H. Yates Construction Co., Main St., Hamilton, will let the electrical work.

Messrs. J. P. & C. H. McKay, Bank of Hamilton Bldg., Hamilton, Ont., will build an apartment house at the cost of $30,000 and will let the electrical work.

Messrs. Stuart & Sinclair, 77 Jackson E., Hamilton, Ont., have been awarded the contract for the new office building of the Chipman-Holton Knitting Co., Cannon St., Hamilton. They will sub-let the electrical work.

Mr. V. K. Stalford, electrical engineer, Sun Life Bldg., Hamilton, Ont., has been awarded the contract for designing and supervising electrical installation in the new factory of the National Paper Goods Co., 114 Queen St. N., Hamilton, Ont.

The Canadian Westinghouse Co. secured a permit recently to make a $25,000 addition to their plant.

The Hoover Suction Sweeper Company of Canada, Ltd., have recently purchased property adjoining their main property, from the National Paper Goods Company.

Stuart Bros., Hyde Park Ave., Hamilton, Ont., have been awarded the contract for rebuilding the Manual Training School at Hamilton. They will sub-let the electrical work.

Galt, Ont.

Tenders are being called for electric wiring of new machine shop, on Hobson St., Galt, Ont. Architect, J. Evans, Esq., 30 Water St. N., Galt.

Ottawa, Ont.

Mr. H. L. Allen, 272 Bank St., Ottawa, Ont., has received the contract for electrical work on apartments on Breezehill Ave., Ottawa, Ont.

Mr. Geo. A. Crain, 285 Clemow Ave., Ottawa, general contractor for the new warehouse of the F. J. Castle Co., Ltd., 685 Wellington St., Ottawa, will receive tenders for the electrical work.

Tenders are wanted for electric wiring of new warehouse of Messrs. F. J. Castle Co., Ltd., 685 Wellington St., Ottawa.

The Packard Electric Co., St. Catherines St., Ottawa, have been awarded the contract for electrical supplies and transformers, for the Ottawa Hydro-electric Commission, 75 Laurier Ave. W., Ottawa.

The Marchand Electric Co., Bank National Bldg., Montreal, has been awarded the contract for the electrical work on the new Dairy Bldg. at the Experimental Farm, near Ottawa.

Capt. W. P. Grant, 81 Somerset St., Ottawa, Ont., wants prices on electric light fixtures for large apartment house.

Winnipeg, Man.

At a cost of $1,000,000 the Winnipeg School Board will erect new schools and additions to schools at the following locations: 6 rooms in rear of Aberdeen School; 16 rooms corner of Denning and Ellice Ave.; 8 rooms Bannatyne and Arlington; 4 rooms connected with Cecil Rhodes No. 2; 15 rooms corner Arlington and Aberdeen; 12 or 14 rooms north of Machray School. Site not yet chosen. The general contractor, Mr. Thos. Sharpe, 609 Electric Rly. Cbrs., Winnipeg, will let electrical work.

The Main Street barns of the Winnipeg Electric Railway Company were recently destroyed by fire, resulting in damage estimated by the company's officials to run to about $400,000. The principle item of loss is the rolling stock, which included twenty cars, four sweepers and two work cars. The loss on the building is placed at $50,000.

Rapid extension of hydro-electric power under the Manitoba Power Commission for the coming year was provided for by the provincial government recently when an order-in-council was passed authorizing the expenditure of $516,500.

The city council of Winnipeg has awarded contracts for the extension of their power house at Point du Bois at a cost of $198,335 to the Empire Waterworks Supply Co.

Montreal, Que.

Messrs. A. & D. Boileau, 546 Fabre St., Montreal, have been awarded the contract for additions and alterations on factory, Panet St., Montreal. He will net the electrical work.

The Town Council of Montreal West has voted $200,000 for improvements among which will be a new lighting system.

Messrs. Vincent & Say Electric Co., 351 Union Ave., Montreal, have been awarded the contract for electrical work on the alterations to a bank on Jacques St. Montreal. Also the contract for electric wiring of the new factory, warehouse and cold storage plant of the Holt Renfrew Co., Ltd., Montreal.

Mr. S. D. Vallieres, 370 Marlow Ave., Montreal, is open to receive prices for installing electric light and fixtures in 24 flats on Northcliffe Ave., Montreal.

Edmonton, Alta.

The money by-laws providing over a million dollars for power house and telephone extensions and other works were voted down by ratepayers.

Messrs. Thomas, Jamieson & McKenzie, Calgary, Alta., are the contractors for the new Medical Building of the University of Alberta. They will probably sub-let the electrical work.

The Allen Electric Co., 10707-96th St., Edmonton, Alta., have been awarded the contract for electrical work on the new warehouse and showrooms of the Cockshutt Plow Co., Edmonton.

A new warehouse is being erected on 103rd St., Edmonton, Alta., at a cost of $450,000. The general contractors, Messrs. Carter-Halls-Aldinger Co., Ltd., 103rd St., Edmonton, will sub-let tenders for electrical work

Vancouver, B. C.

The Broadway Electrical Co., 1517 Broadway W., Vancouver, B. C., has been awarded the contract for electrical work on the new stores, lodge, and class rooms of the Chinese National League, 108 Pender St. E., Vancouver.

The Union Steamship Co., of B. C., Vancouver, are open to receive tenders for electric wiring, electric bells and fans and two 40 kw. 110 volt electric generating sets, for a new vessel which they are building. Apply to consulting engineer, Mr. Henry Darling, Powell St., Vancouver, B. C.

Point Grey, B. C.

A $75,000 residence is being erected at Point Grey, B. C. Tenders will be called soon for the electric wiring. Architect, Mr. Bernard C. Palmer, 850 Hastings St. W., Vancouver.

A by-law has been passed at Point Grey for two new schools. Tenders will be called soon for electric wiring.

London, Ont.

Tenders are wanted for electric fixtures and supplies on the Leach House, London, Ont. Plans and specifications with the architect, Mr. H. A. McBride, Molson's Bank Bldg., London, Ont.

London is closing a ten year period in the Hydro-electric Light and Power business with more than 14,000 customers and a connected load of 49,000 horsepower.

Commissioner Philip Pocock, at a recent session of the Public Utilities Commission, put forward a scheme for the construction of a dam in the Thames River at Springbank Park, where approximately 1,000 horse power could be developed for a limited period to level off the daily Autumn peak of the Hydro-electric service. The cost of the dam and generating equipment might reach $300,000.

Charlottetown, P. E. I.

Tenders for electrical work on the new artificial ice plant at Charlottetown, P. E. I. are being called by Mr. E. C. Blanchard, architect, Charlottetown, P. E. I.

Verdun, Que.

Stores and residences are being erected at Verdun, Que., including 17 flats at a cost of $39,000. Owner will let electrical work. Apply Maison A. Beaulieu, 244 St. Catherine St. E., Montreal.

Stratford, Ont.

Mr. Peter Sylvester of Ontario St., Stratford, Ont., has been awarded the tender for electric wiring and fixtures on new boiler house at the factory of the Kindel Bed Co., Stratford, Ont.

Windsor, Ont.

The Dickie Construction Co., Ryrie Bldg., Toronto, has been awarded the contract for the new warehouse of the Canadian Fairbanks Morse Co., Ltd., at Windsor, Ont., and will sub-let the electrical work.

Sumerside, P. E. I.

Tenders are being called for electrical work on the alterations to the hospital on Central St., Summerside, P. E. I. Plans and specifications with the architects. Address correspondence to Mr. H. T. Holman, Summerside, P. E. I.

Saskatoon, Sask.

The Canadian Westinghouse Co., Hamilton, Ont., has been awarded the contract for delivery and installation of a 5,000 kw. turbine engine at a cost of $145,000, by the city council of Saskatoon, Sask.

Bellis, Alta.

The Bellis Milling Co., Bellis, Alta., will shortly install an electric lighting plant in their works. It is expected that the town will purchase power from them. Address correspondence to the manager at the mill.

Brockville, Ont.

An Eastern Ontario Hydro-electric rally will be held shortly at Smith's Falls, when it is expected Sir Adam Beck will officially turn on power from the new High Falls development to serve the Rideau Hydro System.

Bashaw, Alta.

A by-law has been passed for a new electric lighting system at Bashaw, Alta., and the contract awarded to Mr. J. McCarty, Bashaw, Alta.

Victoria, B. C.

The Murphy Elec. Co., 603 Sayward Blk., Victoria, B. C., has been awarded the contract for the electrical work on the new Indian Industrial School at Alberni, V. I., B. C.

Coleraine, Que.

Tenders are wanted for electrical work on twenty-five workmen's residences at Coleraine, Que. Tenders will be received by the manager, Mr. B. J. Bennett, Thetford Mines, Que.

Midland, Ont.

Messrs. T. J. Campbell Co. Ltd., Midland, Ont., have been awarded the contract for electrical work on a new bank at Midland, Ont.

Cobourg, Ont.

The Central Ontario System of the Hydro-electric Power Commission is considering the development of Raney Falls at Campbellford, where 9,000 horsepower is said to be available.

Port Arthur, Ont.

Port Arthur is to be the relay point between Winnipeg and Toronto for the Canadian National's through telegraph line from Montreal to Vancouver. Five 500 volt motor-generators will be required to handle the load.

Halifax, N. S.

Messrs. Arthur & Son, Argyle St., Halifax, have been awarded the contract for wiring the new convent on Russell

Sarnia, Ont.

Tenders are wanted for electric wiring of new Collegiate and Technical School at Sarnia. Plans and specifications with Messrs. S. B. Coon & Son, architects, 810 Excelsior Life Bldg., Toronto; Melvern F. Thomas, consulting engineer, 229 College St., Toronto; or Mr. W. T. Goodeson, Sarnia, Ont.

Beaverdale, Que.

Messrs. Costello, Bellamy & Crowe, Bank St., Ottawa, Ont., have been awarded the contract for electrical work by the Beaver Co., Beaverdale, Ont., on the alterations to their factory.

Pembroke, Ont.

Messrs. Dunlop & Co., Pembroke St., Pembroke, Ont., have been awarded the contract for the electrical work on the new Lutheran Church at Pembroke.

Granby, Que.

The contract has not yet been let for the electric wiring of the new convent at Granby, Que. The Architect is Mr. Alcide Chausse, 72 Notre Dame St. E., Montreal.

Sault Ste. Marie Ont.

Messrs. McNamara Bros., Queen St., Sault Ste. Marie, have been awarded the contract for electric wiring of the new convent at Sault Ste. Marie.

Three Rivers, Que.

Mr. Eugene Girard, Three Rivers, Que., has been awarded the contract for wiring twelve new houses on Park Houlistin, Three Rivers, Que.

Moose Jaw, Sask.

The Moose Jaw Gas & Electric Co. has been awarded the contract for wiring the new school at Eyebrow, Sask.

Yorkton, Sask.

The contract for electric wiring of new school at Yorkton, Sask., has been awarded to the J. Dowd Co., 735 Corydon Ave., Winnipeg, Man. Vacuum cleaners are still wanted.

Rowell River, B. C.

Twenty-one cottages are being erected at Rowell River, B. C., at an estimated cost of $75,000. The general contractor, Mr. Leonard C. Stevens, corner of 21st and Collingwood Sts., Vancouver, will call for tenders for the electric wiring.

Peterboro, Ont.

Fire destroyed the Lakefield power plant recently, leaving the village in total darkness.

Grand Forks, B. C.

Construction of the electric power line from Grand Forks to the Rock Candy mine at Lynch Creek, B. C., will be proceeded with during the summer by the South Kootenay Power Company, it is stated, and it is also expected that considerable improvements will be made to the electric plant of the company at Cascade, B. C.

Fredericton, N. B.

The Miramichi Light & Power Company of Northumberland County, New Brunswick, is asking power from the local legislature to develop White Rapids, Miramichi River. The plan proposes a 300-foot dam which will empound sufficient water to develop 6,000 h.p.

Quebec, P. Q.

An electric oven at a cost of $1,500 will be installed at the business place of Mr. Horace Ferland, 230-232 Napoleon St., Quebec, P. Q.

Tenders will be called in May for electrical work on a new school at St. Francois D'Assise, Que. Architects are Messrs. Tanguay & Chenevert, D'Aiguillon St., Quebec, P. Q.

Miscellaneous

The firm of Wiggett's Battery Supply Company at Sherbrooke, Que., has been newly incorporated under the name of Electrical Repair and Supply Company, with total capital stock of $75,000. They will carry on the business of manufacturers of all kinds of electric apparatus, also of manufacturers' agents.

Canadian Line Materials, Ltd., is a new firm recently incorporated with headquarters at Hamilton, Ont., with a capital stock of $200,000. They will manufacture all kinds of electrical transmission and railway line materials.

The firm of Marchand Bros., Montreal, manufacturers of electrical machinery, has been acquired by a newly incorporated firm, and will operate under the name of Marchand Electrical Works, Ltd., and continue the manufacture of electrical machinery. It is capitalized at $50,000.

It is stated that the British Columbia Telephone Company has placed an order with the W. T. Henley Telegraph Works of London, England, for a submarine cable to connect Vancouver Island with the mainland. This will duplicate the company's present capacity.

Conduits Company, Limited, Toronto, recently distributed a handsome 1920 calendar. The background is a reproduction of an original painting by J. W. Gossard, English water color artist, entitled "Beauties of Monterey."

In order to co-operate fully with the shipping interest on the Atlantic coast, the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently established a division of its Marine Department at 165 Broadway, New York City.

Mr. H. J. Griswold, who in May 1918 was engaged from the Dominion Engineering & Inspection Co. to organize and operate the Canadian branch of Messrs. McGovern & Co. Inc., of New York City, is completing a two year contract on June 1st, and will then resume active participation in the affairs of the Dominion Engineering & Inspection Co., in which he is a partner.

An official notice of the winding up of the Bedford Light Company has been published in the Quebec Gazette.

The National Telephone Company which has extensive connections in districts south and east of Levis, Quebec, are installing a special all-copper telephone line between St. Agapit, St. Flavien, St. Croix and Lotbiniere village, and then through to Quebec and Montreal over connecting lines.

The Sherbrooke ratepayers recently voted in favor of expenditures amounting to $577,000, $300,000 to be used for electrical and $277,000 for water works improvements. The sum for the electrical department is in connection with Two Miles Falls improvements.

The Roller-Smith Co., Chicago, are distributing a folder describing their Type H. A., pocket, portable ammeters, voltmeters and wattmeters, for alternating current.

The Bell Telephone Company is now installing the two-party line system in the residential districts of Montreal. Persons who are moving, or taking up new residences, are being put on a two-party line.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 309 Broadway
CHICAGO - - - 1413 Gt. Northern Bldg.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, May 15 1920 No. 10

Ontario Power Shortage Acute—Instal a Steam Plant

From all points in the Province of Ontario come signs that the shortage of hydro-electric power, and its significance, are being more fully realized. During the past winter, established, staple industries were frequently handicapped and within the week the newspapers contain reports that one of the largest prospective power users in the province has stopped building operations and threatens to remove to a location where sufficient power is available. If an industry that is already established finds it necessary to move, what can be said of many new industries that would have come to the province but, being forewarned, have gone elsewhere.

The cold facts, which had much better be faced, are simply these: That unless a further substantial supply of power is made available within the near future, not only will all new industries fight shy of certain sections of the Province of Ontario, but the main manufacturing industries at present located here will be forced to mark time, and this, in turn, will force the same condition on all the smaller dependent industries and trades.

One does not need to specify here:—take the household appliance business for example. Where will be the incentive to buy or the excuse for selling the dozen-and-one time and labor saving devices that have already come to be looked upon by many housewives as necessities. And if the dealers have nothing to sell the whole selling organization of the [illegible] built up at the expense of much money and time, will naturally fall into a condition of decay. The electrical retail trade, as such, was just beginning, after many years of floundering about, to establish itself on a solid foundation. There is no such thing as standing still. Either we continue to go ahead or we go back.

It seems inevitable that the Chippewa scheme cannot be ready to deliver power much, if any, before the winter of 1922-23. The obstacles in the way of hastening this work have been almost insurmountable—material shortage, labor shortage, labor inefficiency. Practically all the working conditions have been unprecedented and difficult to anticipate. The only question now is—can anything be done?

There is only one apparent solution—a steam plant. This is no new suggestion in these pages, but it comes again with added force in view of the seriousness of the industrial situation. Fifty thousand horse-power at some strategic point may cost more than the same amount of hydro development, but it is not the cost of power our factories are complaining about—"Give us power at any reasonable cost" is the cry.

There is no need or use, at this time, to enter on a discussion of the advantages or the disadvantages of a steam auxiliary. Opinions differ—some of them honest and some political—but the bare fact is that Niagara-supplied Ontario is driven into a corner so far as power supply is concerned. Any solution under such circumstances is justifiable and, in this case, "any solution" means—"a steam plant."

Large Steam Turbine-Generator Has Record Run of Nearly Three Months

Operating without a shutdown for a period of 84 days, 11 hours, 36 minutes, the 45,000 kw. Westinghouse turbine-generator at the power plant of the Narragansett Electric Lighting Company has established a world's record for the continuous operation of a multiple-element steam turbine of the cross-compound type. During this run there were generated 51,104,000 kw. hr. or considerably more than the total output of the Narragansett Company for any year prior to 1915. In fact, this unit generated about 85 per cent. of the total station output. Furthermore, this record was made with the load varying from a minimum of 6,000 kw. to a maximum of 41,000 kw. To some extent this continuous operation was made possible by means of an 800-gal. self-contained lubricating system. Oil is pumped through a cooler to the bearing at the rate of 600-gal. per hour.

One of the most important features of this run was the fact that the turbine was operating under ordinary conditions. No preparation was made for the run, for when the unit was started early last December there was no thought other than to operate for a week, which is the ordinary period of a run. Abnormal weather conditions, however, brought about such a demand for power that it was not considered economically advisable to shut down the unit until the conditions were relieved. Even at this time it was not necessary to stop the turbine, but existing station conditions allowed this procedure.

All Calgary Public Utilities Show Good Surplus

The financial statement of the operation of the public utilities of the City of Calgary, which is just to hand, shows that all departments made a substantial surplus during the year 1919, which the various figures cover. The total assets of the Electric Light and Power Department now amount to $2,772,862. The total revenue from this depart-

[illegible] was $27,2[illegible], from which amount a sum of $24,219 was carried forward to surplus account.

The capital expenditure on the street railway system is now $2,834,158. The revenue from the railway system was $834,413, of which the surplus amounted to $42,233. The following interesting statistics compare the year ended Dec. 31, 1919, with the same period in 1918:

	1919	1918
Miles operated	2,993,714	2,735,264
Hours operated..	304,551	279,019
Passengers carried..	16,261,845	12,928,882
Revenue per car mile	25.799c	22.155c
Operating exp. per car mile	19.477c	16.145c
Operating exp. per car mile	$1.914	$1.582
Cost of power per car mile	3.37c	3.368c
Average fare per passenger	4.761c	4.687c
Average daily receipts..	$2,286.06	$1,746.79
Average daily operating expenses.	$1,597.53	$1,150.09
Average daily operating expenses including fixed charges	$2,170.35	$1,722.91
Percentage operating expenses to revenue...	69.9%	65.8%

The waterworks department carried forward to the balance sheet the amount of $9,742.

Mr. A. G. Graves is Commissioner of Industries in Calgary, and Mr. R. A. Brown, Electrical Engineer and Superintendent of Street Railway.

Proposed Tax on Unlicensed Insurance

The proposed legislation at Ottawa to tax unlicensed insurance companies is causing various organizations and large business firms to enter vigorous protest with Sir Henry Drayton, Minister of Finance. It has been pointed out that the imposition of a discriminatory tax of 15 per cent. on premiums of insurance written by unlicensed companies would cause an almost complete elimination of such insurance and would, at the same time, yield the federal authorities no appreciable amount of revenue. If competition is the life of trade—and it undoubtedly is—many interests feel that the mutual companies should have no such handicap placed in their pathway as is mooted.

It is stated that about 80 per cent. of the total insurance on property in Canada is already controlled by licensed companies, thus practically constituting a monopoly, and that a tax on unlicensed companies would virtually put them out of business in allowing the licensed organizations to have full swing. This would, it is contended, result to the disadvantage of the country as a whole.

The Canadian Manufacturers' Association recently laid certain facts before the Minister of Finance. That body submitted that the value of the competition from unlicensed companies could scarcely be exaggerated. It had not only been responsible for a maintenance of reasonable rates but had been an important factor in the reduction of Canada's appalling fire waste. The attitude of the C. M. A was summed up in the declaration that insurance is not a proper subject for taxation and that it is not in any sense a commodity. It was pointed out that an insurance policy is a contract under which the insurer agrees to pay a financial indemnity in the event of certain conditions arising, and, therefore, the taxes paid by licensed insurance companies cannot be considered as a levy on insurance. Such assessments are very properly imposed for the privilege of carrying on a profitable business and hamper the insurance companies to no greater extent than the taxes paid by other firms.

The Association also sets forth another feature, which should not be lost sight of, viz., that, while the transaction by insurance with unlicensed companies involves sending considerable sums of money out of Canada, it also involves the sending of no small amounts into Canada through the payment of losses. The manufacturers believe that the harm done to the community as a whole through the imposition of a tax on persons taking advantage of the existing competition, would much more than offset the comparatively trifling revenue to the Dominion which such a tax would produce..

Nova Scotia Has Good Power Supply

Hon. Mr. Armstrong of the N. S. Legislature, in a speech recently, quoted the following figures from an address given by Mr. K. H. Smith, the engineer sent by the Dominion Government to investigate the water power of th province of N. S. Some of the leading water powers that have been investigated and fairly accurately estimated show that:

East River, Sheet Harbor could provide	15,000	h.p.
West River, " " "	17,500	"
St. Margaret's Bay, upwards of	10,000	"
La Havre River could provide	26,000	"
Medway River "	35,000	"
Liverpool " "	8,500	"
Bear " "	5,000	"
Le Quill " "	6,500	"
Paradise " "	7,250	"
Nictaux " "	8,200	"
Gasperaux " "	8,600	"
St. Croix " " . . .	8,200	"

making a total of 155,750 h.p. Some of the waterways have not yet been thoroughly investigated, but Mr. Smith estimates that Nova Scotia could develop an approximate saleable horsepower of 300,000.

Last Meeting Toronto A.I.E.E.

The American Institute of Electrical Engineers, Toronto Branch, held a "Question Box" meeting on Friday evening, May 7, at the Engineers Club. Topics discussed included: wireless transmissions; power transformers; a. c. generators; rates for electrical energy; induction generators; relationship between technical and commercial phases of electrical industry. This was the final meeting of the year.

Would Use Big Stick on Our Necks!

Members of a Washington Committee appointed to investigate conditions in the pulp and paper industry threaten that unless Canada gives them an adequate supply of pulp they will adopt "strong arm" methods and use a "big stick" on our necks.

Senator Underwood is quoted as declaring that "we must find the most effective big stick we can lay on their necks, in case they refuse," and another member of the Washington Committee, in reply to a suggestion that they approach Canada in a conciliatory spirit, urged that they "be conciliatory, but carry a club."

Various suggestions were made to cut off our supply of coal, oil, sulphur, etc., and place a prohibitory import tariff on our eggs and other Canadian farm produce.

This is the same old game. For years the United States has bluffed Canada on the water power supply. There are plenty other markets for our eggs and wheat, and coal at $15 and up a ton is not so very much of a favor any way. An embargo may work out to be the very best thing that could happen to us. Do not let us lose sight of the fact that Canada possesses one-fifteenth of the world's coal supply.

If the United States has made up its mind to act nasty in the matter of exchange of products, we say "Go ahead."

Fine Record of Montreal Electric Luncheon Club

The last luncheon of the season of the Montreal Electrical Luncheon was held on April 28th, when the annual report was presented. In addition to this business Mr. J. N. Mochon, a member of the examination board, created by the Act for the better protection of public buildings from fire, spoke on the work of that board, and also on the inspection of electrical installations in public buildings. In our last issue we published the main provisions of the regulations under this Act. Mr. Mochon stated that the board had been created in pursuance of the policy of protecting public buildings from fire. He pointed out that the records showed that 75 per cent. of the fires in the province were due to defective electrical or steam installations, and it was therefore important that the public should be protected in this respect. The electrical contractors' section of the Montreal Builders' Exchange were now inquiring into this matter, with a view to seeing whether it was desirable that some changes should be embodied in the regulations as approved by the Lieutenant Governor in Council. The regulations had also been considered by some of the manufacturers of electrical apparatus. It was possible that some changes might be made, but these would have to be approved by the Provincial Government.

Mr W H. Winter, President

The code in question had been compiled after inquiries were made in different parts of the United States and in Canada, and various portions had been taken from these codes and incorporated into the one approved by the Lieutenant Governor. The public utility companies were exempted from the law under certain conditions, and the board of examiners would be glad to take up with the various public utility companies, the interpretation of any particular part of the law in which they were interested.

Mr. Mochon then outlined the salient parts of the law, explaining the licensing system and the protection given from outside workmen. So far, he said, the law applied only to public buildings, but it might be that the law would be extended to include other structures. There was a certain amount of co-operation between the steam stationary engineers and those engaged in electrical work. For instance refrigerating installation came under the electrical department, the board holding that the men who operated these plants should have a sufficient amount of electrical knowledge to safeguard the public.

The report of the luncheon was submitted by Mr. J. S. Chennell, the secretary-treasurer. It was of a most satisfactory character. From a beginning of seven members in the first year, the membership had grown to an average attendance of 48 in 1916-17, 58 in 1917-18, 65 in 1918-19, and 81 in 1919-20. During the first year members of firms who were represented totalled 12; in 1918, 125; and this year the records showed 200 firms or individuals who had attended more than once. Mr. Chennell then referred to the Goodwin meetings, held in February last, which were organized by Mr. M. K. Pyke, and which were made possible through the Montreal Electrical Luncheon. These meetings had resulted in closer co-operation between the different manufacturers, jobbers, contractors and dealers. During the year the luncheons were attended by many visitors from different parts of Canada, from England and from the United States. Altogether 28 meetings were held, at which talks on various technical and general topics were given. The receipts totalled $263.00, and the expenditure $188.00, leaving a balance of $75.00. The report then referred to the good work done by Mr. J. W. Pilcher, chairman of the Finance Committee; Mr. Geo. Templeman, chairman of the Paper Committee; Mr. S. W. Smith and Mr. A. J. Carroll, of the Luncheon Committee, and also the general committee. In concluding, the report alluded to the efforts of Mr. W. H. Winter, the president, who had given much time and effort to make the luncheons the success they were.

Brief speeches were made by Messrs. Templeman, Smith, and the president. Votes of thanks were passed to Mr. Chennell, whose work was commended by every speaker, and also to Mr. Winter, who has had a very prominent part in organizing the luncheons from their inception.

Northern Electric Company Has Inaugurated a Liberal Pension Scheme For Employees

At the regular meeting of the Board of Directors of the Northern Electric Company, held in December last, authority was granted for the establishment of a plan for an Employees' Benefit Fund for the granting of pensions and benefits to the employees of the company. This plan has now been put into effect, dating from April 1, 1920, and the sum of $150,000 has been placed to the credit of the fund. It is the intention of the Board to credit interest at the rate of four per cent. per annum on the unexpended balance and to supplement this by such additional appropriations as may be required to maintain the fund at this amount.

The administration of the fund is in the hands of a committee composed of the general superintendent, the secretary, the general sales manager, the chief engineer and the chief accountant.

Article 2 of the plan, as outlined in a little booklet issued by the company, will be of general interest and is as follows:

Pensions

2.1—"The plan provides the following as pensions for employees who are retired and who come under the classes listed below. Employees in Class A may be retired on pension, either at their own request or at the discretion of the committee. Employees in Classes B and C may be retired on pension only at the discretion of the committee and with the approval of the president or vice-president.

2.2—Class A.—A male employee whose age is sixty years or more (female fifty-five or more) and whose term of employment has been twenty years or more.

2.3—Class B.—A male employee whose age is fifty-five but less than sixty years (female fifty, but less than fifty-five) and whose term of employment has been twenty-five years or more.

2.4—Class C.—A male employee whose age is less than fifty-five years (female less than fifty) and whose term of employment has been thirty years or more.

2.5—Class D. Disability Pensions.—An employee whose term of employment has been fifteen years or more and who becomes totally disabled by reason of sickness or injury, other than by accidental injury arising out of and in the course of employment by the company, may, at the discretion of the committee, and with the approval of the president or vice-president, be granted a disability pension, which shall continue for such period only as the committee may decide.

2.6—The annual pension in any of the above cases shall be one per cent. (1%) of the annual pay based on the average annual pay of the ten consecutive years of service during which the retiring employee was paid the highest annual pay, multiplied by the number of years in the employee's "Term of Employment."

2.7—For example: An employee whose "Term of Employment" at the time of retirement has been 30 years, and whose average pay for 10 years has been $1,500 a year, will receive an annual pension equal to 30 per cent. of $1,500.00 or $450.00, payable in monthly amounts of $37.50.

2.8—The minimum pension will be twenty dollars ($20.00), but this is not to apply to disability pensions granted to employees of less than ten years' service.

2.9—Pensions granted to employees retired on account of age or length of service shall continue from date of retirement to death of pensioner, except as otherwise provided.

2.10—Regular employment under a salary with this company shall suspend the pension payments to a retired employee during the period he continues in such employment.

In addition there are liberal accident, sickness and death disability benefits.

Section—Length—Resistance Relations of Conductors

By E. B. Merrill, B.A., B.A.Sc., M.E.I.C.

The straight-line diagram, alignment chart, abacus or nomogram, as it is variously called, shown on the opposite page, gives the inter-relation of resistance, length and cross section of various conductors.

The more common conductors are placed on the resistivity (specific resistance) line in accordance with their resistance per circular mil-foot (C.M.-Ft.) at 20 degs. C or 68 degs. F., (a normal indoors temperature). Those higher up on the line are usually spoken of as resistance metals, being employed usually on account of the smallness of their conductivity, to produce heating effects rather than to prevent them.

As the scales are divided logarithmically, to multiply any of the quantities by a given amount means simply shifting the point up on its line by the distance between the point marked 1 and that representing the multiplier, as is readily understood by one familiar with the slide rule, and to increase by a given per cent. is to multiply by 1 plus the decimal representing the per cent.

The working temperature of the conductor must be determined or assumed and its position on the resistivity line raised or lowered accordingly. If known in per cent. increase of resistance, its position is raised by a corresponding distance noted at the bottom of this resistivity line. For decreased resistance, since 10, 20, 30, etc., per cent. decreases are obtained by taking 90, 80, 70, etc., per cent. of the given resistivity, the corresponding point is lowered by the distance, say, from 100 to 90, 100 to 80, 100 to 70, etc., on the scale.

Unifer is a hypothetical conductor of unit properties: 1 microhm per centimeter cube; unit density, etc.; being convenient to use as a multiplier in conductor calculations. 1 microhm or 1/10^6 ohms per cm. cube is equivalent to 6.0153 ohms per cm. foot, or practically 6 ohms, so that the position of any metal on the right hand scale is equal, in ohms, to its resistivity in microhms per cm. cube, raised by the distance between 1 and 6 approximately, if at 20 deg. C.; also lowering the point of any conductor on this scale by the same distance gives its cubic centimeter resistivity in microhms; again raising it by the distance 1 to 5.28 and multiplying by 1,000 gives the ohms per C.M. mile. (A simple way to transfer these distances is by marking on the edge of a sheet of paper.)

The notes on the chart define its use, although the application to several examples may help to suggest some of its possibilities:—

1. What is resistance of 12.5 miles No. 6 B & S aluminum? (The chart gives commercial hard drawn at 68 deg. F.) Join the aluminum on Rsl to 12.5 miles on L, noting the point on CL. Revolve straight edge on this point until it passes through No. 6 B & S, and it will give 45 ohms (approximately) on R. Incidentally No. 6 B & S is seen to correspond approximately to 26,000 C.M. and 12.5 miles to 66,000 ft.

2. What section of copper cable is needed to keep the d.c. resistance of a 40 mile conductor within 10 ohms at normal temperature? Find point on CL between "copper" and "40 miles." A line through this point and 10 ohms on R gives approximately 220,000 C.M.—somewhat larger than 4/0 B & S.

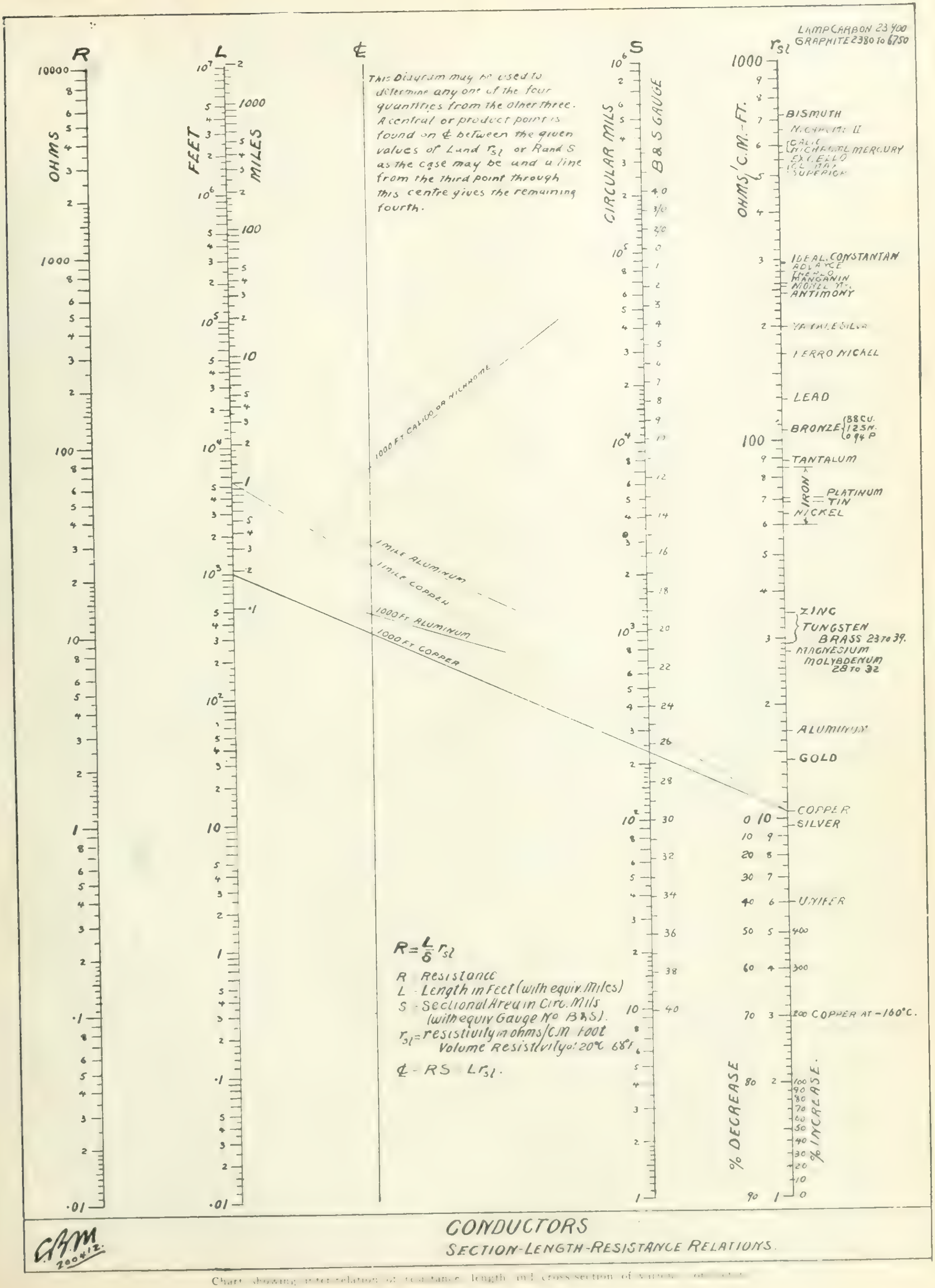
3. The resistance of a spool of No. 22 B & S insulated copper wire is 2.4 ohms. What is length of wire? Join 2.4 on R to No. 22 B & S on S and through point on CL and "copper." A straight line gives 150 ft. on L.

4. Assuming that 400 C.M. nichrome wire would carry 3 amps. for certain heating apparatus, what length would be required on 110 volt circuit if we assume that its resistance is increased, say, 25 per cent. by the heating? R will be 110/3 =36.7 ohms hot. Join 36.7 on R to 400 C.M. on S noting point on CL. Through this point and the nichrome point, raised 25 per cent., a straight line gives approximately 20 ft. on L.

Bell Telephone Employees Becoming Stockholders

A scheme is being put into operation by the Bell Telephone Company, Montreal, whereby all employees of the company whose terms of service are one year and over may take a financial interest in the company's business. Any employee may purchase one share of stock for each $300 or fraction thereof, of the annual rate of pay which he or she is receiving at May 1st, 1920, but not exceeding twenty shares. Three dollars per share per month will be deducted from the employees' wages for payments on the stock. Dividends will be credited as if the stock were fully paid, but interest will be charged at the rate of 4 per cent. on unpaid balance.

The following trustees have been appointed by the board of directors of the company to acquire the stock to carry out the agreement with employees: Messrs. A. T. Smith, division superintendent at Toronto, W. H. Black, secretary; and W. H. Winter, general superintendent of plant, Montreal.



This Diagram may be used to determine any one of the four quantities from the other three. A central or product point is found on ℄ between the given values of L and r_{sl} or R and S as the case may be and a line from the third point through this centre gives the remaining fourth.

$$R = \frac{L}{S} r_{sl}$$

R - Resistance
L - Length in Feet (with equiv. Miles)
S - Sectional Area in Circ. Mils (with equiv Gauge No B&S).
r_{sl} = resistivity in ohms/C.M. Foot Volume Resistivity at 20°C 68°F

℄ - RS = Lr_{sl}.

CONDUCTORS
SECTION-LENGTH-RESISTANCE RELATIONS.

Chart showing inter-relation of resistance, length and cross-section of various [illegible]

Engineering Features of Tramway Operation

By D. E. Blair, A.M.E.I.C.*

The object of this paper is to point out some things that may be done to effect a more complete solution of the transportation problems that face us to-day. Further progress must be guided by an appreciation of sound engineering principles unfettered by consideration of established custom, expediency, ward politics, and selfish wire pulling.

The matter of urban transportation has always been a vital factor in the life of city dwellers but in a passive sense. The public at large are now active partners in the operation, as well as the users and patrons of the street railways of many cities, and we should now realize that the street car service in any large community serves a greater number of people and is of greater importance than any other form of traffic, and should therefore be given prior rights, within reason, over all other vehicular traffic. Since the rate of fare and the quality of service rendered depend entirely on the overall efficiency of operation, it seems to be an opportune time to bring to the attention of this influential society the greater importance of educating street car users to a fuller understanding of the fundamental factors that make for efficient and satisfactory operation.

It is of great importance that they should know, and fully appreciate, how and to what extent, the hearty co-operation and goodwill of the public, and of the municipal authorities, is necessary to the consumation of the carefully worked out plans of the management of public utility organizations toward further improvements. It may be stated that the present equipment available and in general use has reached a very high standard. No consideration of cost or lack of engineering skill stands in the way of further progress, and the art has reached a stage where little remains to be done, that is within the control of railway managers, to improve the standards of modern car service. Under existing conditions we have reached a point very near to maximum theoretical efficiency, and this question presents itself; can existing conditions be modified, without injury to other interests, so as to result in improvements that are worth while?

Many recognized opportunities for improvements still remain undeveloped owing largely to a strange unreasoning attitude of the public against any reforms that are suggested by the capitalistic monsters who thrive in idleness upon the fabulous wealth wrung from the hands of those who toil. This is the mental fog that must be dispelled by education before much further progress can be made. Public commissions now supervise every transaction, and have more than a theoretical control of actual operation. It is interesting to note that the rapidly increasing rates of fare are coincident with the increasing effectiveness of public supervision.

The primary requisites of a satisfactory system of transportation may be stated as follows: first, speed; second, safety; third, comfort; fourth, continuity of service; fifth, frequency of service; sixth, convenience of service. Any increase in the standards of the last five items is likely to add to the cost, but it is well that we should realize that an increase of speed, within the practical limitations of speed traffic, will tend toward greater economy without necessarily affecting the question of safety, and higher speed will add very materially to the efficiency of the service. Speed of transportation may in fact be considered as a fundamental requirement of a satisfactory service, and it should, therefore, be the out-standing object of all effort toward improvement. By speed or scheduled speed is meant the average or effective speed with which a car covers distance, and this should not be confused with velocity at any given moment or with maximum speed attained between stops. In order to intelligently analyze the question of schedule speed it is necessary to introduce a very convenient figure which allows us to dissect and study the fundamentals of all traffic movement, viz. the speed, time, curve.

The movement of a street car from one end of a line to the other is made up of a series of hops or cycles from station to station, or from stop to stop, and it will be one of the chief purposes of this paper to show to what extent the public would benefit by a radical increase of the distance between stops. If they would once realize this fact, they would insist upon an immediate change. These cycles vary in length and the time necessary to operate over each one is subject to conditions of grade, density of traffic, etc., but a study of a single average cycle will bring out all the characteristics of a series of such cycles which constitute any run. What happens in such a cycle can be represented very accurately by a diagram constructed of four distinct elements representing each of the four factors of which any typical run or cycle is constituted.

The four component elements of our curve are as follows:

1st. Period of acceleration from rest to maximum speed under the action of propelling forces.

2nd. Period of coasting without applied power and without restriction of motion other than from friction.

3rd. Period of decelleration of slowing down under the retarding action of brakes and friction.

4th. Period of rest at stopping points.

Each of these periods is subject to certain practical limitations but each one is also affected by variable elements, some wholly within the control of the operating crew, some depending entirely upon the passengers, and others subject to motor capacity, interference of independent traffic, physical conditions, etc. The efficiency of the whole is dependent upon the co-operation of the general public for whose benefit the cars are operated but who are prone to magnify the value of petty advantages to the individual at the expense of the general welfare. Control of traffic by the municipal authorities also has a serious bearing on the matter.

The rate of increase of speed is in proportion to the resultant of all the forces acting on the car. The forces applied to produce motion are rarely limited by the capacity of the motors but should be controlled within a reasonable degree of comfort to the passengers.

A certain definite amount of energy must be applied to a body of known weight in order to impart a given speed to that body. In the case of a car in city service the energy absorbed in overcoming friction is quite small. A very large proportion of the applied energy is utilized to overcome the inertia of the car. All of the energy applied to overcome inertia, and, therefore, impart speed, at the beginning of a cycle remains stored up in the car, by virtue of its motion, in the form kinetic energy and is available to perform useful work in overcoming frictional and other resistances throughout the rest of the cycle of motion. It is a fact, not generally recognized, that within the limits of wheel slippage, the faster the rate of accelleration of a street car the less power is consumed to produce a given speed. This is partly due to the inherent characteristics of the series wound motors universally applied to this kind of work. These characteristics are such that a series motor is capable of producing maximum torque at maximum efficiency at the low speeds at which a large part of the total work within a cycle is performed. A high value of motor efficiency is maintained at the higher speeds as well. A further outstanding advantage is that it will automatically adjust its speed in keeping with the nature of the work it has to perform, thus tending to keep down the current drawn from line within the limits of its capacity.

---

* [illegible]

The speed of a motor under a given load is definitely fixed by the voltage applied to its terminals. The line voltage being constant and the maximum current allowable during acceleration being limited, it is necessary to absorb the excess voltage during that period by switching inert resistance into the main motor circuit. For this reason about one half of the energy drawn from line during the time of controlled accelleration is absolutely wasted in the rheostats. It is therefore, desirable to shorten this period and to impart as much of the final speed as possible after all wasteful resistance has been eliminated and the motors are working at a high overall efficiency. The importance of fast accelleration goes far beyond a question of energy wasted in rheostats. High speed is essential if we wish to overcome space in minimum time. It is obvious that the more quickly the maximum speed of a given run is reached, the shorter the time that will be necessary to cover the distance between stops, or to state this in another way, the higher the average speed throughout the run the lower will be the maximum speed necessary to traverse a given distance in a given time. It is to be noted that the element of danger in the operation of vehicles of any kind is qualified by maximum speed attained rather than by the more reasonable average speed. Average or scheduled speeds can be increased without increasing the hazard.

Experience and careful recording of actual conditions has shown that good traffic control, prompt movement of passengers, alert action by the conductor, and immediate response of motorman to his signals will result in practical loading and unloading delays as low as one second per passenger in fairly large batches, and three seconds per passenger when only one or two passengers are handled. The average length of stops in some cities is less than three seconds.

Under these conditions, operating companies are providing far more cars than are necessary to perform the relatively poor service rendered, but it is physically impossible on account of slow despatching of our units past congested areas.

If we always keep in mind the idea that every car on every city line can be considered as a link in an endless chain belt, it will be easy to realize the advantages that would accrue to both the public and the company if the speed of the whole chain can be increased. The strap hanger may quite properly be said to pay the dividends, but the rear platform acrobat is a general nuisance and should be treated as such.

Under prevailing conditions, here and elsewhere, it is not found practicable to make better speed than eight miles per hour when a car has to make ten stops per mile. About nine miles per hour is the maximum possible speed that can be made within the limits of accelleration, braking, and time of loading previously mentioned when making ten stops per mile.

By the simple expedient of increasing the distance between stops from 528 ft. to 880 ft., it is easily possible to maintain a practicable schedule speed under exactly the same operating conditions, of 12 m.p.h.

In other words, by adding 352 ft. or 66 per cent. to the distance between stops, a trifling matter when studied intelligently, we can add 50 per cent. to the effective speed of every car on the system.

The element of safety is not affected, and the higher speed means that every passenger will get to his destination in one third less time. Why has this practice not been adopted? Simply because the voice of the individual who runs a banana-stand at a street corner where a stop has been eliminated is louder than the demand of the public for a constructive plan of improvement in their car service. Incidentally, it may be said that the possibilities of increasing prevailing schedule speeds in this direction are not striking until the average distance between located stops is greater than 538 ft. or ten stops per mile. As spacing is increased beyond this limit, the advantages are very interesting and the opinion may be expressed that there is no good excuse for placing stopping points less than 800 ft. apart.

When the car is at rest ten seconds each stop, a schedule of 8.6 m.p.h. can be maintained, with seven second stops a speed of 9.3, and with four second stops, 10.1 m.p.h.

Here are evidently some possibilities but the question of cost must not be lost sight of.

If increased schedules entail increased costs, we will have to find a compromise which while benefiting the public in the way of better service, will not be a burden in the way of higher fares.

The two large items of cost directly affected by car operation are power and platform labor. Power can be calculated once the run characteristics are fixed, and platform labor is inversely proportional to schedule speed. Combining the two then, will give a very close index of the trend of running costs.

We found that by decreasing the time of stop from ten seconds to four seconds, the schedule could be increased from 8.6 to 10.1 m.p.h. Since no change in the motorman's performance is necessitated by the change in the time at rest, power per car mile will be the same in both cases. Under the conditions stated, power will cost 3.93 cents per car mile at 1 cent per kw. h.

Platform labor at 45 cents per hour will cost at 8.6 m.p.h., 10.47 cents per mile, and at 10.1 m.p.h. 8.91 cents, so the combined costs are 14.4 cents and 12.83 cents respectively.

Coincident, therefore, with the marked increase in possible schedule speed than can be brought about by the assistance of the public, is an equally marked reduction in operating costs.

Calculating from similar speed time curves, it is found that at eight stops per mile instead of ten, under equally efficient car handling, a speed of 11.2 m.p.h. can be reached, and at six stops per mile, 12.55. Figuring power and platform labor as before, we see them to be—at 10.1 m.p.h., 12.84 cents; at 11.2 m.p.h., 11.57 cents; and at 12.55 m.p.h., 10.2 cents.

Let us see if the increased distance between stops imposes any serious inconvenience

Ten stops per mile means 528 ft. between stops or 176 ft. average walking distance, aside from cross street travel. At three miles per hour, this requires thirty seconds to walk.

Six stops per mile means 880 ft. between stops or 220 ft. average walking distance, requiring fifty seconds.

Now by having our stops 880 ft. apart and obtaining cooperation for quick movement at stops, we saw that a schedule of 12.55 m.p.h. is possible, or let us say 12 m.p.h. Please remember that this is the only way by which a 12 mile service can be made.

It is suggested that the average passenger walk twenty seconds further. If he is going two miles, he can save five minutes or three hundred seconds. If he is going five miles he can save twelve and one half minutes; if ten miles, twenty-five minutes. This for an extra walk of twenty seconds.

The public in a city like Montreal take some 210,000,000 car rides a year. Assume the average ride at two miles. The annual saving of time to the public by a twelve mile service as against one of eight m.p.h. is 17,500,000 hours or 2,000 years.

It is worth remembering that this saving to the public in general would be accompanied by a substantial reduction in operating costs and also a marked saving in capital investment, since the same service can be maintained with 800 cars at 12 m.p.h. as with 1,200 cars at 8 m.p.h. Cars of a type suitable for heavy traffic in Canadian cities cannot be purchased just now for less than $20,000 each. Car house facilities, car house expense, etc., would, of course, be in proportion.

It would seem, therefore, that in view of the prohibitive cost of equipment, during the present period of false values, it would be a sane policy to find ways and means to use existing equipment to better advantage before we talk of undertaking capital expenditure to meet the growing demand for transportation.

It might well be asked, can the above reasoning be carried further? The answer is: very much further; but with the provision that the general public will have to realize much more fully even than is necessary for the carrying out of the suggested changes, that street car traffic is by far the most important kind of city traffic and that nothing should stand in the way of improving it. With non-protected tracks and even well regulated vehicular traffic schedule speeds higher than 12 m.p.h., begin to approach dangerous conditions on account of the higher maximum speeds necessary.

Provide a curb protected strip 6 in. or 8 in. high for tracks, on certain streets reserved for express service, stops about 1,500 or 2,000 ft. apart, and protected crossings, and there is nothing to prevent a twenty mile schedule.

The unthinking part of the public might regard this as a restriction on their right to wander all over the highway, but in actual time, the gain would much more than offset any imagined inconvenience; but let us get the twelve mile service first.

The outstanding features to be remembered are:

(1) That higher schedule speeds are desirable from every point of view. They can be obtained without extra cost and without affecting safety of operation.

(2) That higher speeds will result in an improved degree of comfort and frequency of service because of less over-crowding and shorter headway between cars.

(3) That speeds higher than those now prevailing depend almost entirely on reducing the number and time of stops and that a decrease in the number of stops is of more importance than a decrease in the time of stops.

(4) That convenience is only a relative factor. An extra walking distance of a few feet is of no real moment when compared with the outstanding advantages of quick transportation. One cannot have private taxi cab service at tramway fares but there is no reason why the speed of taxi cab service cannot be approached.

(5) That appreciably higher speeds cannot be obtained by any possible means within the control of operating companies. Improved service rests in the hands of the users of street cars. Questions of car designs, motor equipment, routing of cars, etc., are all of some importance, but their effect on the quality of service is negligable when compared with the possibilities of improvement along the lines suggested.

(6) That the bogie of high cost cannot be used as an argument against faster service because higher speeds in city transportation tend toward lower operating costs.

(7) Higher speeds will result in a more efficient use of existing equipment, with the result of curtailing the demand for the non-essential production of rolling stock in favor of the real necessity for greater production of essentials.

(8) It may be stated that it is absolutely essential to investigate every possible means of increasing the efficiency of existing rolling stock in order that we may partly effect the radical demands for increased wages.

Exhorbitant Demands of Tramways Employees

An example of the exorbitant demands of unskilled labor is that of the men of the Montreal Tramways Company. In 1918 they were given increased wages totalling $750,000, last year a further increase of $1,250,000, and now they come forward with claims of $3,500,000. At present some of the men are earning $200 per month, including overtime—a high wage for men who do not require any special qualifications—for motormen and conductors, at any rate. The demands are for increases from 56 to 100 per cent., according to length of service, in addition to various concessions in the matter of hours, holidays, clothing, etc. Beyond this, it is required that the company shall refuse to employ any man who does not belong to the union, and shall discharge any man who is in arrears with his union dues.

The Company and the Tramways Commission have refused the demands, but the latter have promised to ascertain if they are able to set aside a sum to augment the earnings of the men. The acceptance of the demands would have involved an addition of at least two cents to each fare, and the Commissioners have declined to alter the fares this year. The Trades and Labor Council support their fellow workmen, but curiously enough protest vigorously against paying higher fares—a truly illogical attitude in keeping with the usual position taken by this body. The public are already paying for the previous increases, and it is probable that, if the claims of the men had been granted it would be necessary to charge a ten cent fare or three tickets for 25 cents.

Unskilled labor was never so well paid as it is to-day, and the constant additions to wages has apparently emboldened the tramway employees of Montreal to make demands which are out of all reason. The earnings of such men may be contrasted with those who possess education and knowledge, and with those who occupy fairly responsible positions in commercial life. As an instance, we may refer to an advertisement in a Montreal paper for a professor of French and Spanish in a Western college, where the salary is $2,000.00 per year. Better get a job as a tramway conductor in Montreal.

The Light is Now Breaking Through

In the United States and Canada the street railway business is over a six billion dollar industry, and represents the savings of millions of people who have placed their money in insurance, trust and investing corporations.

One has only to consider the stupendous nature of these figures to realize why municipalities and governments have appointed supervisory authorities whose duty it is to see that not only the people served get a square deal, but also that this tremendous investment is conserved and protected so that it may continue to serve the public in the best interests of the community.

The grave situation which confronted street railways during the war, when rapidly increasing costs of materials and labor almost wiped some of them out, is still with us, and is being met by supervisory authorities abrogating old-time contracts and granting necessary increases in fares to produce revenue required to furnish adequate service.

It is largely from this broad, fair and patriotic view of the situation by the powers that be, that fares for trolley rides have been increased four and five times, giving:

59 cities with a 10 fare,
47 cities with an 8 cent fare,
118 cities with a 7 cent fare,
158 cities with a 6 cent fare.—Winnipeg Electric Public Service News.

Seven Cent Fare for Nova Scotia Tram

A bill to increase the rates that may be charged on the cars of the Nova Scotia Tramways and Power Company was introduced in the House of Assembly recently. It calls for the payment of three rates—seven cents for a single fare, four tickets for twenty-five cents, or a strip of sixteen tickets for ninety cents or five and five-eighths of a cent each. Under the old law the company was compelled to lay a certain type of block paving between the rails and two feet outside them on any street which the city decided should be paved. The bill now before the House provides that the company shall not be required to use a paving material more expensive than that which the city uses in its portion of the work. Another proviso of the bill is that after July 1st, 1921, the Board of Public Utilities shall have jurisdiction over the rates to be charged by the company on its street cars. At present this is solely the prerogative of the legislature.

Ask 60-70 Per Cent. Increase

The employees of the Toronto Street Railway have made a demand for an increase in wage from 50-55 cents per hour to 85 cents per hour. They also demand that the present arrangement whereby the half hour, which is generally necessary to complete runs, and for whch no pay is received, be paid for at the rate of overtime. Mr. R. J. Fleming, general manager of the company, says: that to accede to the demand of the men would cost the company a little less than $3,000,000 for one year.

Hull Electric Installing Transformers

The Hull Electric Company are installing two 60-cycle, 11,000/2,200 volt, 1,200 kilowatt transformers. These, along with switching and other auxiliary equipment, were supplied by the Canadian General Electric Company.

Two More Rotaries for Montreal Tramways

The Montreal Tramways Company, Montreal, have placed an order with the Canadian General Electric Company for 2-2000 kw. rotary converters, in addition to the two already on order, for the new Cote Street sub-station, Montreal. The contract for the building steel for the superstructure had been given to the Dominion Bridge Company, Montreal.

The Gaspereau River Light, Heat, & Power Company, of Wolfeville, Nova Scotia, are making alterations to their plant. A 600 horse power water turbine is also being installed, the order for which was given to the S. Morgan Smith Company, of York, Pa.

[illegible] Government will [illegible] to sell the N. S. & T. Railway lines to the Hydro-electric Power Commission of Ontario.

Electric Show Will Not Be Held

The promoters of the proposed Electrical Show in Montreal during the summer announce that the project has been abandoned. The proposed show was to be a purely private venture, and was not backed by any of the electrical interests. We are informed that the support promised was not sufficient to warrant the promoters going ahead with the exhibition.

The Administrative Commission of Montreal has given a contract to the Canadian General Electric Cómpany for the manufacture and installation of transformers and commutators necessary for the operation of two electric water pumps. The order for one pump has gone to Fraser and Chalmers of Canada, Ltd., and the order for the other to E. Laurie and Company, Montreal.

Personals

Mr. T. Delbridge, superintendent of the Port Arthur telephone system, is resigning to go to the Peace River country.

Mr. W. L. Macfarlane has been appointed manager of the Stormont Electric Light & Power Co., Ltd., and Cornwall Street Railway Light & Power Co. Ltd., to succeed Mr. C. U. Peeling.

Mr. W. E. Thau, general engineer, Westinghouse Electric & Manufacturing Company, has been appointed engineer in charge of marine section of the Engineering Department.

Mr. G. E. Stoltz, general engineer, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has been appointed engineer in charge of the steel mill section of the Engineering Department.

Mr. C. W. Moat, chief operator of the St. Lawrence Division of the Hydro-electric Power Commission, Cornwall, Ont., has been transferred to Toronto. Mr. J. F. Anderson, of Belleville, will temporarily fill the position vacated by Mr. Moat.

Mr. W. R. Reynolds, superintendent of the public utilities commission at Listowel, Ont., is severing his connection with the commission there and has accepted a similar position in Kincardine, Ont., where he takes charge on May 1st.

Mr. L. A. S. Wood, prominent in illuminating engineering circles both in this country and in Europe, has been made manager of the Illuminating Section of the Supply Department of the Westinghouse Electric & Manufacturing Company, with headquarters at South Bend, Ind.

Mr. W. G. Murrin, assistant general manager of the B. C. Electric Railway Co., has sailed for England. He will probably be absent three months. During his visit he expects to lay before the board of directors of the company in London some of the post-war problems facing the management in Vancouver.

Mr. J. A. Burnett, electrical engineer, of Smart & Burnett, consulting engineers, Montreal, has been appointed to assist in the government valuation of the electrical equipment of the St. Clair River tunnel, the Oshawa Electric Railway and the Montreal and Southern Counties Railway for the Grand Trunk Railway interests.

Obituary

Mr. J. A. Craig, of Montreal, one of the pioneers of the electrical industry in Canada, died recently at the age of 83. Mr. Craig was a builder of dynamos, and turned out what is believed to be the first electrical dynamo ever made in Canada.

STOP! LOOK! LISTEN!

Perhaps no more significant incident could be offered to herald a pause in the steadily upward trend of prices than the announcement of the big Wanamaker store in Philadelphia that all prices would be cut to make an average reduction of 20 per cent. Further it is stated that the store policy will be to make new purchases only on a basis which will permit of this reduction being made. The lead of Wanamaker will have a wide influence. Whether any such action will be taken by the big stores in Canada is a point upon which no information is available, but it is reported that one of the mammoth retail concerns has had the quietest period for the spring season of the past ten years. Certainly an effort is being made to make prices more attractive, to judge by the advertising.

In Business and Trade Circles

It appears that clothing and apparel lines are being hardest hit. Whether this is the result of very unfavorable weather or whether the public disapproval of high prices, as evidenced in the overall campaign, is having its effect upon consumption cannot be definitely answered, but perhaps it would be best to say that it is the effect of the combined influences. While there had been no tendency to produce in excess of prospective demand there is no doubt but that such unfavorable weather as we have experienced has tended to bring about an accumulation. Then it is reported that a lot of Japanese silks were dumped into Canada with some effect upon the market for dress goods and linings, and in the clothing trade there was an effort made prior to the last settlement with labor to get considerable stocks ahead to provide an available surplus in the event of a tie-up.

Altogether the situation in the clothing and apparel trades indicates that high prices are having their effect. It takes but little slackening of demand to result in over-production. In the hat trade, for instance, these tendencies are strongly in evidence. With practically no spring weather until this week the habit of getting the "old one" cleaned and blocked has increased, with the result that the average man is merely passing from winter to summer so far as his headgear is concerned.

In other lines there do not appear to be the same indications of a reaction. True, speculation has been very largely discontinued under the double influence of curtailment of loans by the banks and the growing belief that it is not a time to stock up. In foodstuffs there is no indication of weakening prices nor does it seem likely that there will be any marked change until there is some market increase in supply, for it does not appear likely that consumption can be further reduced to any marked extent.

In the steel and other metal trades the situation is firm. Here the shortage of material is still maintaining prices, but there is no tendency to buy stock at present quotations. Steel is being bought for quick consumption on a premium basis and few chances are being taken. In hardware lines there appears to be a fair spring movement and prices are firm to strong.

The Financial Situation

The general outlook is for higher rates for money. Capital is being demanded in many directions and interest rates are strengthening. The further decline in Victory bond quotations in a few weeks is an indication of the trend of money values. Bond dealers foresee difficulties in securing the funds desired for provincial and municipal purposes at anything like satisfactory rates. Should the Dominion Government desire to float a loan this fall it is hard to see how this can be done except at rates that will discount previous issues. However, it is more than possible that there is a connection between the Government's plans and the course being taken by the banks in putting on the brakes.

Higher rates on mortgage loans appear to be inevitable under such conditions. The general situation in the money market will be reflected here. This promises to add further uncertainty to the building situation. There is little to encourage the speculative builder and much to discourage him. Building will, therefore, be largely confined to those who are making homes for themselves. The solution of the housing problem seems as far off as ever.

The outlook for prices for building materials is very unsettled. Dealers and manufacturers say that they can see no reduction in costs and, therefore, nothing to warrant lower prices. On the other hand, it is understood that the policy of the banks may mean that some dealers will have to dispose of at least a portion of their stocks and this may force supplies on the market.

Altogether it is a very unsettled situation and one in which the wise business man and investor will watch developments closely. And in sounding this word of caution we would like it to be distinct from pessimism. The position which Canada occupies to-day in world's relations leaves no room for pessimism. The world is waiting for our goods. If we cannot produce and market at prices to compete with other nations under present conditions then a readjustment is inevitable—and the sooner the better.

Effects of Ranges on Distribution Layouts*

The rapidly increasing use of electric ranges has introduced a new consideration into the problem of secondary distribution, and one which may eventually predominate. In districts where gas is not readily available for cooking—as in rural communities, some small towns and certain sections of larger cities—coal ranges are rapidly being displaced by electricity. This is especially true of sections where the houses are all new and of the better class. In such places nearly 100 per cent. range load may be expected as soon as the houses are occupied. In older sections the change is more gradual, a new installation being made here and there from time to time, although it is probable that eventually these districts also may approach 100 per cent.

On secondaries with residence lighting load only and no cooking load the density of loading ordinarily may range from zero up to 20 kw. per 1,000 ft. of line, being ordinarily about 15 kw. for a well built-up district of the better class of single residences or two-family flats. Where a few ranges are interspered with a large number of lighting services the peak load will not be increased very greatly since the heaviest range load will come during the day when the lights are off and can be cared for by the installations provided for the lighting load. Of course, the peak is affected somewhat, since in the winter months during the lighting peak the range load will overlap for a short time. As the number of ranges increases they become an increasingly important factor in the total load. When all or nearly all of the services have ranges the distribution system must be designed for the range load primarily and lighting load becomes of secondary importance. The load density in such a case must be figured considerably higher than for the lighting only.

The diversity factor for range load is high, owing to the variations in the time of using different ranges and in the number of elements used at one time on any one range. On some tests recently made the average load per service was found to be about 2 kw. per range for five ranges of about 5 kw. rating each.

The Average Load

The average load no doubt decreases with an increase in the number of ranges considered. Probably from 1 kw. to 2 kw. would be a fair average load to assume, depending on the number of such services. This would give a load density of 40 kw. to 60 kw. per 1,000 ft., which is two to three times greater than for lighting only in similar districts.

In the older districts mentioned, where the range load is "spotted" here and there, each new installation must be considered separately. The secondary wire is already in place and usually, especially when it is No. 4 or greater, it would be uneconomical to change it. In order to supply satisfactory service the transformer must be near enough to the range for good voltage conditions. It is impossible to make any general rules as to transformer spacing, as it is impossible to know when or where ranges will be installed next. Rules should be adopted as to the maximum distance allowable from transformer to range for each size of secondary considering the probability of there being other ranges in between. When a range is installed, if too far from a present transformer, a new transformer must be installed or an old one moved to care for it, providing at the same time for [illegible] lighting load as well. The size of transformer must also be adjusted to the change. In some cases it may be found economical to increase the size of secondary wire instead of installing an additional transformer. The economy of such a change should be determined, however, by a careful consideration of the annual cost of each type of installation, including the additional cost of making the change. It is seen that the problem in this case is one of providing satisfactory service for the individual load as it comes on rather than one of economical installation over a period of years to care for a general class of loading.

Problem In New Community

Eventually in these older districts the range service will be frequent enough that the load may be considered as uniformly distributed load of high density. This also is the condition met with in new sections as mentioned above. A good example of a problem of this was recently encountered and cared for as follows: A large manufacturer purchased a tract of land in the vicinity of his plant, subdivided it into lots 50 ft. by 125 ft. and proceeded to erect residences which he sold to his better paid employees, heads of departments, etc. As no gas service was available it was expected that practically every house would install an electric range. Such has since proved the case. The first section of houses built was in two blocks, each about 900 ft. long, or a total of 1,800 ft. The expected load was assumed to be 40 kw. to 60 kw. per 1,000 ft. In order to get an indication of the sizes of wire and transformers to be used, the problem was first attacked on a purely theoretical basis. The voltage was 220-110 volts, three-wire secondary. After comparing the annual costs on line transformers and energy losses, it was determined that the most economical size of wire would be, for a load density of 40 kw. per 1,000 ft., 54,000 circ.mil; for a load density of 60 kw., 66,600 circ.mil. No. 2 wire with a cross-sectional area of 66,370 circ.mil seemed to be the nearest available size. For No. 2 wire the most economical size and spacing of transformers would be: For load density = 40 kw., 31 kw. transformers, 784 ft. apart; for load density = 50 kw., 36 kw. transformers, 600 ft. apart.

It was decided that 25 kw. transformers spaced 600 ft. apart would be the best design, since an even spacing would be thus secured over the 1,800 ft. of secondary in question; that is, a transformer 300 ft. from each end and one-half way between. Since the full range load was not expected immediately, 10 kw. transformers were first called for in the two end positions with the centre one omitted. As the load builds up the additional transformer and larger sizes will be added. This is sufficient to care for a load of 42 kw. per 1,000 ft. If the load goes beyond that, still larger sizes can be installed in the same locations.

This layout brings up two rather evident questions—first, as to the comparatively small size of transformer and short spacing for such load; second, as to whether a No. 4 wire would not be advantageous with such short spacing. In order to keep the voltage drop under 3 per cent., the transformer spacing must not be more than 825 ft. for 50 kw. density or 900 ft. for 42 kw. per 1,000 ft. on No. 2 wire. It was found that the annual cost of an installation of 50 kw. transformers at 900 ft. was about 15 per cent. greater than 25 kw. units at 600 ft. No intermediate size between 25 kw. and 50 kw. was available at the time. Likewise it must be remembered that a high diversity factor was used in determining the expected load. For good service the voltage conditions must be such as to care for the customer furthest from the transformer. With four services per pole the load transmitted to the farthest pole would probably be as high as 10 kw. at times. This would greatly reduce the spacing possible when the load is uniformly distributed. The same [illegible] were uniform at 50 kw. per 1,000 ft., transformers could be spaced 680 ft. apart on No. 4 wire with 3 per cent. drop. However, with No. 4 secondary and 25 kw. transformers, the savings in annual cost at 42 kw. load density is only about 2½ per cent., and it was considered more advantageous to obtain the better voltage conditions and greater adaptability to still larger loads by use of No. 2 wire rather than to save this amount.

---

*[illegible]

Effect of Changing Conditions

The consideration of the economical aspects of such a problem involves the use of prices of copper, transformers, energy, etc., as they are at present. A change in those prices at some future date might give a somewhat different layout, but it has been found that a considerable variation would be required in order to affect the results. Moreover, the assumptions as to the character of heavy range loads may be considerably changed when more definite information is obtained as to the result of actual tests on such load. The building project which gave rise to the above problem is only the beginning of a program of considerable extent which when completed should be a fertile field for the study of such problems.

It is easy to see that if the uses of electric ranges becomes anywhere near universal in urban districts, present standards of distribution must be revised considerably. Larger sized secondaries will be called for than are generally used for lighting loads. Probably a greater variety of large transformer sizes than are now necessary on any system will be found advisable, and the whole system of transmission feeders, etc., will have to be adapted to the heavier load. The effect on the load of the central station as a whole would be somewhat like that of a large additional power load with a comparatively low load factor.

Election of A.I.E.E. Officers

At the annual meeting of the Toronto Section of the American Institute of Electrical Engineers held in the Engineers' Club on April 23rd the following officers were elected for the year 1920-21:

Chairman, Frank Ewart, Ewart, Jacob & Byam; secretary, Perry A. Borden, Hydro-electric Power Commission; members of executive committee, O. V. Anderson, Toronto and Niagara Power Co.; L. B. Chubbuck, Canadian Westinghouse Co., W. P. Dobson, Hydro-electric Power Commission S. E. M. Henderson, Canadian General Electric Co.; George D. Leacock, Moloney Electric Co. of Canada and Walter F. Wright, Eugene F. Phillips Electrical Works.

Westinghouse Opens Employees' Cafeteria

On April 6, the largest eating place in the world was officially opened by the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa., giving evidence of what the larger manufacturers of today are doing in the way of providing for the comforts of their employees. This new cafeteria, which is a three-storey reinforced concrete and brick building, 236 ft. by 100 ft., has a seating capacity on the first two floors alone of nearly 2,600 persons. In addition, on the third floor is a dining room with a capacity of 500 and an auditorium with a seating capacity of 1,000.

C.E.A. Convention in Montreal

The Canadian Electrical Association will hold its annual convention this year in Montreal. The headquarters of the convention will be the Ritz-Carlton Hotel and the date June 16, 17, 18, Wednesday, Thursday and Friday. Mr. W. Volkman, Toronto & Niagara Power Co., 10 Adelaide St. E., Toronto, is secretary. ,

Central Ontario Under Hydro Commission

The municipalities of Central Ontario recently passed a resolution to the effect that the Government should transfer the properties known as the Central Ontario System over to the municipalities to be operated by the Hydro-electric Power Commission of Ontario in the same way as the system in South-Western Ontario is operated. It is understood that the representatives of the Central Municipal Association will interview the government during the coming session.

Municipal Convention, June 10, 11.

The Ontario Municipal Electrical Engineers' Association will hold their annual summer convention at Niagara Falls again, with headquarters as before in the Clifton House. The date has been fixed for June 10 and 11, Thursday and Friday. The program has already been tentatively arranged. Professor Mackenzie, University of Toronto, will speak on "Sick Benefit and Pension Schemes"; Mr. P. M. Lincoln on "Metering Consumers' Loads" and Mr. G. J. Mickler, Ontario Hydro Commission, on "Accounting for Electrical Merchandising." Major W. W. Pope, secretary of the Ontario Commission, will be the speaker at the banquet. Mr. S. R. A. Clement, Hydro-electric Power Commission, University Avenue, Toronto, is secretary.

The Business Press and Industrial Efficiency

The importance of the "Business Press" as a factor in bringing about improved economic conditions is being more and more widely recognized. Speaking on this subject at the National Chamber of Commerce at Atlantic City before the Business and Daily Press Group, H. W. Swetland, president of the United Publishers Corporation, emphasized that the publisher, standing in the perspective vantage ground, can foresee and foretell better than any individual operator the necessities confronting industry.

"No greater obligation ever rested on any phase of industrial existence than rests to-day upon the press of this country, whether the publications are secular, educational, general or industrial. The necessity of economic production must be told and retold. The publisher, standing in the perspective vantage ground, can foresee and foretell better than any individual operator the necessities confronting the great industries. He must utilize his organization for careful investigations, familiarize himself with the economic processes, and he must then be fearless in his denunciation of improper methods and practices.

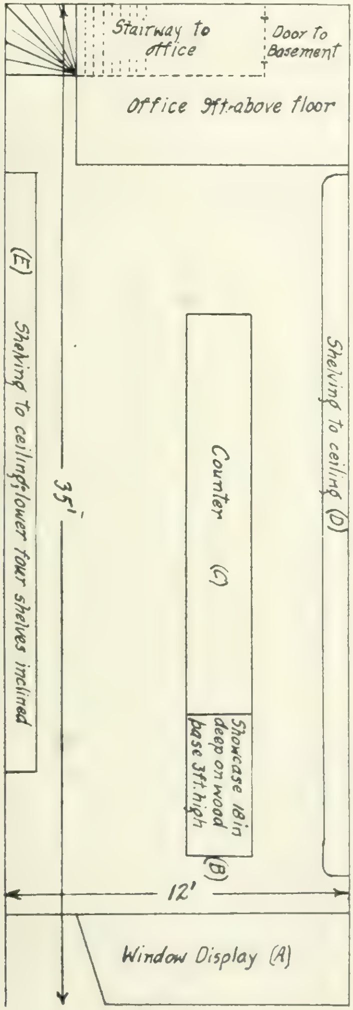
"The press of North America has never fully understood and comprehended its tremendous influence. It has been too careless of its expression. The time has arrived when this potent influence for betterment of conditions must be used with greater force and certainty. Correct and underlying principles must be stimulated. Encouragement must be given in weak places, and, above all, the danger of inefficiency must be set forth with intelligent and convincing argument."

A Store With a Narrow Frontage

Perhaps the most difficult store to equip is the one with a narrow frontage. The Bright Light Lamp Co., 46 Queen St., E. Toronto, have to some extent, solved this problem. The accompanying plan will show how this company have laid out their store.

The store is 12 feet wide and 35 ft. deep, and is planned out as follows:

A. 8 ft. 6 in., front; 9 ft. 6 in. back; 3 ft. deep.



B. 5 ft. x 2 ft. [illegible] in.
C. 14 ft. x 2 ft. 3 in.
D. 25 ft. x 10 in. Shelves to ceiling.
E. 21 ft. x 1 ft. Shelves to ceiling.
A. to B. 2 ft.
B. to D. 2 ft. 6 in.

The office is built at the rear of the store [illegible] the floor. From floor of store to floor of office [illegible] ft. The repair shop is in the basement.

Shelving "E" is for globes and shades. The shelves are sloping, from the ground up 5 ft., and this is devoted entirely to the larger lamp shades of glass.

The whole of the ceiling is covered with electric fixtures and these are continued into the window forming part of the window display.

The showcase is only 18 in. deep and is resting on a wood frame base. Flash lights are displayed in this case. Better effect would be gained if half the counter space was also taken up with a showcase.

The space under the office could be used for a washer display or some of the other large appliances.

Electrical Industries

The British Electrical Development Association has been registered as a company limited by guarantee, not formed for profit, the word "limited" being omitted from the title by license of the Board of Trade. The objects are: To promote and protect electrical industry and enterprise in the British Empire, to develop the use of and demand for electrical energy for industrial purposes, etc. There are to be founders, ordinary members and associates.

Each founder (including the Institution of Electrical Engineers, the British Electrical and Allied Manufacturers' Association, the Incorporated Municipal Electrical Association, the Incorporated Association of Electric Power Companies, the Electrical Contractors' Association, Incorporated, and the Electric Lamp Manufacturers' Association of Great Britain, Ltd.) is to be entitled to one representative on the Council.

The English Electric Company, Ltd., has definitely acquired Siemens Bros. Dynamo Works Ltd., and it may be of interest to review the scope of this group. The interests and operations of the following firms are consolidated and controlled by the company:—Dick Kerr & Co., Ltd., Preston; Phoenix Dynamo Manufacturing Company, Ltd., Bradford; Willans & Robinson, Ltd., Rugby Coventry Ordnance Works, Ltd., Coventry; United Electric Car Company, Ltd., Preston; Siemens Bros. Dynamo Works, Ltd., Stafford. The company is now able to offer, in the case of steam and electrical plant, designs and methods of manufacture embodying the experience of the various companies named. The design and construction of all civil and engineering work and building in connection with power stations, tramway and electric railway installations, etc., are undertaken.

Did You Know?

Recent investigations show that the lighting provided in 69 per cent. of 446 industrial plants was unsatisfactory, although those responsible for the operation of the plants thought that it was effective and adequate. A slight increase in light in one plant caused a 15 per cent., increase in production, while two other plants showed an increase of production of 20 and 12 per cent. respectively. A tannery by installing a proper lighting system caused an 80 per cent. reduction in rejections in the finishing department. Thus it will be seen that improper lighting is not only harmful to the health and eyes of the employees but also loses the employer money by interfering with the production.

The National Boiler Insurance Company, Manchester, England, have issued a little booklet entitled, "Notes on gas and oil engine accidents." The booklet describes the most frequently occurring failures and gives hints for their prevention; price 1 shilling.

[illegible] & [illegible], Inc., [illegible] their address from 120 Liberty St. [illegible] St., New York City.

The Contractor-Dealer

How Soon Will Town and Small City Electrical Dealers Feel the Competition of "Mail Order" Houses? The Situation is Worth Watching

As the retail electrical business develops the dealers outside of the very largest cities will be faced with the competition of the mail order departments of large departmental stores, just as merchants in other and older established lines are to-day.

The electrical dealer probably does not yet realize how keen a competition this is and how insistently the big departmental stores are urging their goods on the householders of towns all over Canada, when the same goods are available in the store "just round the corner" and often at lower prices. It is the same old story of the distant fields appearing greener, but none the less it is bad business for the local dealer who establishes himself in the community so as to be able to render the community a service.

The retail merchants have fought the competition more or less intermittently, the difficulty being the lack of organization against a more powerful force. Latterly, however, their association has taken the question up actively and, as one phase or another of the situation arises, acts as a mass with the authorities at Ottawa. Just at the moment the matter of postal rates is under discussion and the following letter shows where a real injustice is being done to local industries, while at the same time, the Dominion revenues are not being augmented as the Act intended they should be. The letter is well worth the attention of the electrical dealer:

Memorandum Re Cost of Carrying Parcels by Mail

To the Honourable P. Blondin,
Postmaster General,
Ottawa, Canada.

Honourable Sir,

The officers and members of the Dominion Board and the Dominion Executive Council of The Retail Merchants Association of Canada, an Association of Retail Merchants, representing the views of the retail trade in every important centre in every Province throughout Canada, and who represent a body of merchants who collectively have a larger sum of money invested in the cities, towns and villages of Canada than any other class, and who are the largest taxpayers in every municipality, have requested us to call your attention to the fact that there is a great deal of dissatisfaction and unrest among the retail merchants in every city, town and village in Canada, owing to the great development of a few Mail Order Houses, who, in our opinion, have become immensely wealthy by taking advantage of the low postal and railway rates at the expense of the general public, for the reason that they have been, and are using, public money to enable them to have their goods delivered in all parts of Canada, at which we consider to be a direct loss to the Government and against the best interests of the citizens and taxpayers of every municipality of Canada.

In our opinion, Canada can only become prosperous by having prosperous cities, towns and villages located in convenient parts so as to be of service to the agricultural community, and to those engaged in mining, fishing and other productive pursuits, as well as to serve all those who are engaged in all sorts of occupations and professions, and who make up the civil life of every community.

As an Association of Retail Merchants we are thoroughly convinced that the occupation of the retail merchant is absolutely necessary and that his services cannot be dispensed with. This being the case, we feel that he has a legitimate right to claim the same protection from the Government of Canada that is tendered to every other class.

From all the facts we have been able to secure we are of the following opinion:

(1) That the contract made between the Postal Department of the Dominion Government and the railway companies of Canada for carrying mail matter, including parcel post, is much below the cost of carrying the same and consequently, now that a large part of the railway corporations have been taken over by the Government, the loss so sustained is coming directly out of the public treasury of Canada, to the detriment of the growth and development of the cities, towns and villages of Canada, and for the special advantage of a few mail order house proprietors.

(2) That, in our opinion, if the proper cost for carrying parcels by mail was charged against the said parcel post, that the cost of postage stamps on letters would be greatly reduced.

(3) That, in our opinion, the present rates of wages and commissions that are being paid to the rural postmasters, mail carriers and postal clerks are not in proportion to the service they render, and as this large army of people is being underpaid they are suffering at the expense of the public of Canada, and the mail order houses are receiving the benefit to the detriment of the growth of the cities, towns and villages of Canada.

(4) That when the Post Office Act was amended creating zones of twenty miles radius, each increasing the cost of the mail service the further they proceeded from the point of mailing, we fully understood at that time that this plan would be carried out in reference to mail order house catalogues as well as to all articles sent by parcel post. Since then we have learned that mail order houses send their catalogues by freight or express from their central warehouses to the central post office within the twenty-mile zone, and from this point they are delivered, thus defeating the original proposal.

There are many other important points in connection with this subject that we believed should receive the serious consideration of your department, and, in order that all the facts may be brought out and that full justice may be done to all those who are now suffering through what we consider to be a very unfair system, a unanimous resolution was passed at the last meeting of our Dominion Board, which represents all classes of retail merchants in every province of Canada, requesting the Dominion Executive officers of our association to interview the Postmaster General on this important matter, and to lay our views before him, and to also request him, as well as the other members of the Dominion Cabinet, to appoint a special committee from the members of the House of Commons to hear evidence on this subject, and investigate the same, and provide the necessary remedy.

Toronto Contractors Had Good Meeting

The monthly meeting of the Ontario Association of Electrical Contractors and Dealers was held in the Board of Trade rooms, Royal Bank Building, King St., Toronto, Ont., on the evening of May 6. Dinner began at 7.30 p.m. and the meeting at 8.45. Mr. E. A. Drury occupied the chair in the absence of the president, Mr. K. A. McIntyre.

Mr. Drury on rising said he regretted that Mr. Corcoran, merchandising specialist of the General Electric Co., Schenectady, N. Y., who was to have given the address, could not be with them, but that they hoped to have the pleasure of hearing him on some future date. In the meantime the Canadian General Electric Co., feeling themselves responsible to some degree, had provided something for the evening's entertainment that he believed those present would enjoy. Mr. Drury also mentioned that there were only about forty contractor dealers present as against fifty-three at the previous meeting and he urged those present to see the absent members and get them to come to the next meeting. He then introduced the new secretary, Mr. A. C. McKay.

Mr. McKay confined himself to saying that it was a pleasure to be invited to undertake such work, and that he would try his best to fill Mr. Andrew's place.

Mr. Carthy was asked to make a report on the work of the Merchandising Committee, and he responded by saying that the work of the committee was not sufficiently advanced to enable him to give a detailed report. He would, however, like to say that they were tackling the problems which would mean dollars and cents to the contractor dealer.

Mr. R. A. L. Gray also spoke briefly on the work of this committee and said that their work as a committee was not only to deal with the problems between jobber and dealer but also the problems of the dealer himself. He further said that it was a big job and time must be given to the committee to do the job efficiently. They were working hard and results would be bound to follow.

The question of the closed shop was brought up by Mr. Carthy who suggested that Mr. George Kay of Messrs. Bennett & Wright be asked to make a statement on the matter. Mr. Drury also spoke briefly on this subject.

There was some discussion on the licensing of electrical contractors, but it was decided to let the executive discuss the matter thoroughly and get it into shape for another meeting.

The entertainment provided by the Canadian General Electric Co., Ltd., was in the form of a very interesting Pathescope lecture display on "How a Mazda Lamp is Made."

Mr. F. Palmer added to the enjoyment of the evening by rendering two solos. Mr. H. W. Plows was at the piano.

Jobbers and Contractors Getting Together

At the regular monthly meeting of the English section of the Montreal Electrical Contractors' Association, held on May 3rd, a communication was read from the Electrical Jobbers' Association naming Messrs. Masse, Patterson and Smith as their committee to meet a committee of the Electrical Contractors' Association on the question of sales.

Live Dealer Capitalizes Information Given in a Letter

A western dealer recently had five hundred copies of the letter below circulated among his clientele. He attached it to his own letter, which read:

Dear Mrs. Jones:

I hope you may find some interest in the following letter which was recently received by a friend of my wife and shown to her on account of our keeping an electrical store. If you would care to ask any questions about these appliances, my telephone number is Blank 725.

Yours very truly,

John Smith.

The letter, which was multigraphed, ran as follows:

Dear Mary:

For some time I have intended writing to you, but various things have kept me from my correspondence. To-day, however, I find myself with the time and also with something to write about. The fact is I went into Smith's electrical store a few weeks ago and he persuaded me to buy a toaster. Why I never bought one before I am sure it is impossible for me to say. The stores advertise them and several of my friends possess them, but previous to buying mine I had never seen one in operation. This, I believe is the reason that such things are not often bought. It takes a practical demonstration to arouse the interest of most people. Let that be as it may, I now possess one and find it a great boon. It used to be necessary for me to make the toast before sitting down to breakfast, so that usually the toast was cold when we came to eat it. Harry would get so annoyed at this, but what could one do? Now I have the toaster at my side on the table and make the toast as we want it. Then, too, I can cook the bacon on the stove and place it on the toaster. This keeps it crisp and warm. The tea can be kept warm in the same way, or the coffee—I do not possess an electric percolater yet. The other day hubby suggested another use for it, namely, to warm the dinner plates and this you will admit is invaluable. In the winter time or the early spring mornings the red glow and the warmth thrown off from this little godsend is not to be despised. You can't call it a luxury either, because it is so economical, costing only about 3 cents per hour.

I believe some people are lucky enough to have receptacles in the wall or baseboard of their homes, to which they can connect the toaster, but we have nothing of that kind. We screw out one of the bulbs and screw the plug of the toaster attachment in its place. But I am not complaining about that. Harry says he will get me what they call a two-way plug, which, as I understand it, can be screwed into the bulb socket and there is then room for both lamp and toaster attachment.

There seems to be several other appliances just as convenient and all worked by electricity. I know you do not possess any of these, but I would advise you to enquire about them and get Jim to buy some for you. I have told Harry that I want a grill for my birthday. I must stop now but I am so enthusiastic in their praise that I find it hard to refrain from repeating it all over again. Remember me to Jim and don't forget my advice.

Your sincere friend,

Anne.

P.S.—I quite forgot to tell you that I keep the toaster at my bedside at night, and utilize it to warm baby's food.

J. D. Lachapelle and Company have removed from [illegible] McGill St., to 223 Notre Dame St., W., Montreal.

Selling Electrical Appliances

Choose a Good Location—Use Your Windows For Display and Demonstration—Know Your Goods—Keep Your Promises to Your Customers

By Mr. A. W. J. Stewart*

In the successful selling of electrical appliances the customer should be led through the various stages of attention, interest, desire and action. Even then the sale cannot properly be said to be completed. When the customer has expressed his satisfaction with the article bought and is convinced it will fulfil the requirements for which it was sold, then and then only can the dealer mark it off as a sale completed.

Interesting the Customer

Advertising is the method by which a dealer attracts the attention of prospective customers. There are many methods of advertising available, some of which can be used without any very considerable expense. Newspaper advertisements, display cards on delivery trucks, and the sending of circulars and pamphlets with parcels and letters are inexpensive methods of keeping the question of electrical goods before prospects and customers.

A Good Window Display

A good window display is one of the cheapest forms of advertising, especially if demonstrators are placed in the windows at intervals to show to the passersby the value of the goods advertised. The value of such a demonstration is well illustrated in the accompanying photographs. One shows a view taken immediately after the demonstrator had entered the window and the other, the same window, shortly after the demonstration was begun. Most people are attracted by action and will without fail stop to gaze in a window where there is movement of any kind, when they would not bother to more than glance at an inanimate window display, however attractive it may be otherwise. In any case the window must have some pulling effect that will draw people into the store. Such window advertisement should be followed up by further demonstrations inside the store, where a demonstrator can go more into details, and answer any questions asked by those interested.

Location

The store should be situated on a main thoroughfare and as near to busy cross streets as possible. The goods and fittings inside the store should be neat and attractive. Too much dusting cannot be done by the clerks. Nothing looks worse to a prospective customer than a dingy, dirty stock. Brightness and cheerfulness should stamp everything connected with the store. Good effect is gained by changing the goods around from time to time, adding new lines and at all times keeping the stock up-to-date.

Appliances should always be placed in positions where people "just shopping" can examine them at their leisure. In addition to this, wherever possible, fix up an appliance in such a way that it will give some indication of its use. For instance one of the various styles of "Turnover" toasters will attract a great deal of attention if a piece of toast or imitation toast is placed in the correct position for toasting.

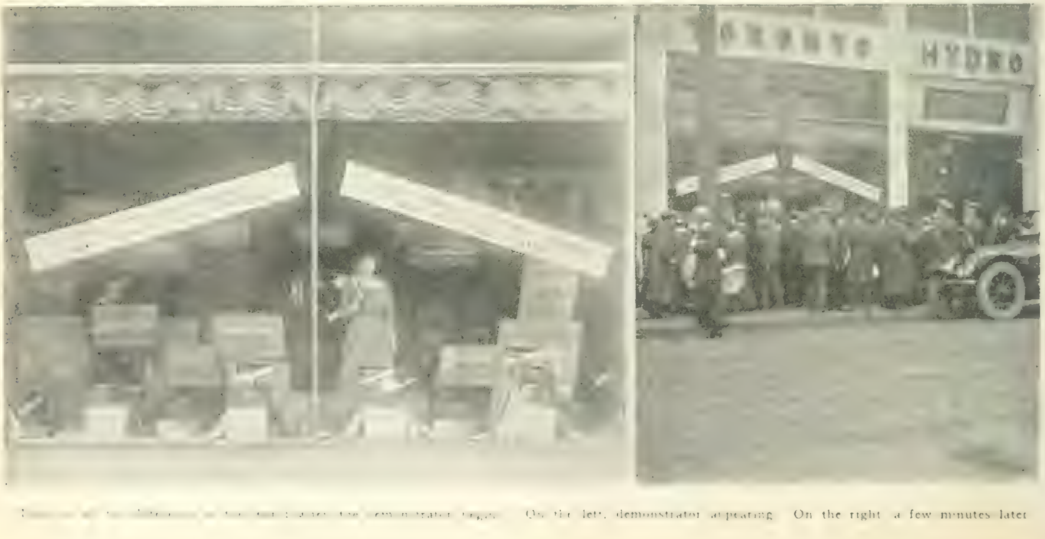
Have Price Tickets

It is a good point to have price tickets on the goods inside the store. Many a customer, while waiting for a parcel to be wrapped up, or for change, will utilize the time by looking at articles nearby. Showing the price in plain figures also establishes confidence in the mind of the prospective purchaser towards a firm adopting such principles.

Another point worth noting is the manner that should be adopted by the salesman when first addressing the customer. Many a person has been frightened away by such

---

*Manager appliance department, Toronto Hydro.



[illegible] demonstrator began. On the left, demonstrator appearing. On the right a few minutes later an abrupt salutation as "Can I sell you an electric washer to-day?" The person thus addressed has the feeling that he is going to be bullied into buying. He would quite probably become interested at once if such a suggestion were made as "That is a great improvement over the old-fashioned washboard." It cannot be emphasized too strongly that to go slowly is the surest way to make a sale.

Making the Sale

It is necessary to size up the customer to determine what arguments will be most likely to appeal. There are many to choose from such as: necessity, convenience, comfort, luxury, pride, novelty, scarcity of help, more freedom and so forth.

Every successful sale should result in mutual advantage to both buyer and seller. If the purchaser is in doubt as to this he should be assured that if the article purchased fails to do the work properly the purchase price will be at once refunded. It is better to lose the profit on the sale than to have the customer lose confidence in electrical appliances, and the firm selling them. An effort should be made, of course, in a case of dissatisfaction, to replace the unsatisfactory appliance by one that is satisfactory. Refunding the money should be a last recourse.

Know Your Goods

It is essential that a salesman should thoroughly know the devices he is selling. The customer has no real interest in the article except in so far as he will benefit by possessing it. If the salesman is not able to point out this advantage, a prospect cannot be expected to make a purchase. If a salesman is ever unable to answer a question put to him by some person examining an appliance, he should take such steps that never again will he be placed in such a position. He should also read the trades journals, not omitting the advertisements. It will enable him to keep posted as to the new developments in the line of goods he handles. Then, too, it is well to be familiar with the competing lines, not for the purpose of knocking them, but so as to bring out more strongly the chief points of his own line and to answer intelligently any question put to him by a customer. Reading the literature published by the manufacturers and occasionally visiting the factories and watching the various processes through which an appliance goes in the making, will all aid him in making a sale.

One very important point in the making of a sale is that one never should unnecessarily confuse the prospective purchaser by speaking of watts, amperes or other technical terms. If the question is asked "How much electricity does this appliance use?" the answer should be in cents per hour, and the customer will be entirely satisfied. If the enquirer has some knowledge of electricity he will probably ask outright the number of watts used, in which case the salesman should be prepared to answer.

Service

The old saying that "A satisfied customer is the best advertisement" applies even more strongly to the sale of electrical appliances than to many other lines, because of the comparative newness of these goods. With proper service every new customer may some day be an old customer. It is up to the dealer to pay special attention to the service he gives, for the simple reason that good service brings new customers and increasing trade gives him greater confidence in the goods he sells. Many a dealer believes the line he carries is at fault when he makes few sales, when in reality it is the poor service given to customers which has resulted in their dissatisfaction and refusal to recommend such a firm to their friends.

Keep Promises

Prompt delivery is very important. A housewife may have used a broom for twenty years but when she orders a vacuum cleaner she wants it—right away. Promises should never be made that cannot be fulfilled. If some unforeseen circumstance prevents the dealer's own delivery wagon from taking the goods, special arrangements should be made, even if it takes the cream off the profit.

Properly qualified demonstrators should be sent to the homes of those who purchase the larger appliances and full explanations given to the housewife. With electric stoves a full demonstration should be given and the many little points which mean saving in power and, consequently money, fully explained.

Prompt Repairs

Repairs should be promptly made, otherwise the customer will be put to great inconvenience, and this again will militate against a good recommendation among that customer's friends. It is a good idea to follow up the sale of the larger appliances and occasionally make enquiries as to the satisfaction the device purchased is giving. It is well to remember that the person who has bought a washer is a good prospect for a vacuum cleaner and the interest shown by enquiries about appliances already installed will provide a good excuse for introducing something else.

Paying by Instalments

To sell appliances extensively it is desirable to have some system of paying by instalments. It will bring sales that otherwise would not be made. Even among the people who can afford to pay cash there are some who prefer to pay this way even though it costs them a little more, the reason for this being that they do not like to encroach upon their savings.

A Few Final Points

A few brief points well worth emphasizing:

Too much talking should not be indulged in by the salesman, otherwise he is likely to talk the prospect into buying and then out again.

It is often possible to get a decision in favor of buying on what is called a minor point, that is: at the proper time getting out the order book and asking the prospect if he will take the article or have it sent. In settling this minor point he will often settle the question of purchase.

Confidence is the basis of successful trading and especially so in the electrical business, as it is only in its early stages as yet.

Two Vacuum Cleaner Hints

The men who canvass from door to door sometimes find it necessary, not only to convince people that they need the article in question, but also to suggest a method of paying for it.

A canvasser selling vacuum cleaners found himself being put off by a lady, with a plea that while she recognized the value of the cleaner she had not the money to pay for it, neither would she take the risk of paying for it on the installment plan. He finally suggested that she take the machine and raise the money for it by hiring it out to her neighbors. This plan appealed to her and she consented to take the cleaner. The scheme was a success and the canvasser received several more orders as the result.

Another lady whose husband objected to paying for a cleaner, arranged with the dealer to take the machine and pay for it with money saved from her house-keeping allowance. She hid the machine in her attic and used it only when he was at work. When it was paid for she left it lying where he could see it. On being questioned by her husband as to how she obtained it she told him the truth. He acknowledged that he had never missed the money and was more ready afterwards to help his wife obtain things which would help her with the housework.

The "Welcome Home" Salesmen's Club

A Trifling Incident in the Store Starts the Partners Thinking—Experiment Week Proved a Certainty

The second meeting of the Salesmen's Club was held at the home of Bert Fraser. Every member was present. Fraser, as host for the evening, took the chair, and Richard Lyons, a retail salesman, was the speaker. The following is the story he related to the boys.

I have been "behind the counter" for many years now and have had some interesting experiences, but the incident I am going to relate is perhaps the most interesting of all, because of the peculiarity of its beginning and the far reaching effects that followed.

The store was in a city some miles from here and the business was owned by two gentlemen whom no doubt the drummers present know well, but whose names, for various reasons, it is best to withhold. They were both good business men and practical but, unfortunately, were temperamentally quite opposites. This resulted in many differences of opinion, and there was constant friction between the two. If such a state of affairs had continued there could have been but one ending—the dissolving of partnership. To have pulled together, instead of opposite ways, would have made their team a powerful one, and later events proved this. To their salesmen they were always friendly and considerate, so that every employee of the firm felt the success of the business was a personal affair.

Just when things were at their worst, everything was changed by a little incident which happened in the store. A lady entered one day to make a purchase. With her she brought two little children. While she was being served the children began to quarrel over a handkerchief, to which each claimed the right of possession. A tug-of-war ensued, in which the handkerchief was torn in two, each child getting a piece. Everyone's attention was drawn to the incident, but none were more interested than the two bosses, who, at the time it occurred, happened to be on more-than-usual bad terms. When the incident was over they laughed about it, until the senior partner became serious and exclaimed "Tom, we are a couple of fools." "How do you mean?" asked Tom. "Why we are no better than those children; we are constantly pulling opposite ways. The result will be the same—a split. Moreover, like the handkerchief, the part of the business that each acquires will be of little value to either of us. Now let us get down to business and straighten this thing out. Even if we are fools we need only be temporarily so." Tom agreed with him and a decided change was noticed from that day.

That was only the incident which brought them to their senses. Now note the change.

Business had been poor for some time owing to their disagreements, and a new store running in opposition had begun to be a serious menace to the success of the firm. None realized this more than the bosses. After their determination to pull together they got down to a serious discussion of plans to cope with this growing competition. First of all they called Jones, Thompson, Graves, and myself into the office for a discussion. Jones was the fixture specialist, Thompson had charge of the window dressing, and the advertising. Graves handled the supplies, and I was in charge of the appliance department. The bosses were frank with us and told of what they had decided. We were asked to be perfectly open and to make any suggestion for improvement that we had in mind. We asked permission to think it over and this was granted us. The four of us got together and talked matters over and finally hit upon a plan of campaign which we called "Experiment Week."

We explained our plans to the bosses and they were delighted, and told us to go right ahead with it. We tackled the advertising first. An arrangement was made with every "movie" in the town to show slides between films, announcing the coming of "Experiment Week," and inviting the public to watch the newspapers for further information. In two of the newspapers a prominent advertisement was published twice a week for some weeks preceding the special sale. In this advertisement it was explained that our firm would place in the homes of all who wished it one appliance for one week's experiment free of all charge, as far as the stock would go. If at the end of a week they wished to keep the appliance, they were to pay down twenty per cent. of the cost and the remainder at the rate of twenty per cent. of its value for four months. If, on the other hand, they did not wish to keep it, the machine would be called for and returned to the store. It was emphasized that those taking advantage of the offer would be under no obligation whatever.

But, temperamentally, they were quite opposite

For window displays we decided to have no special decoration, but to demonstrate in the window each day of the week a different appliance. The demonstrations were under the charge of experts. Clothes were washed with the washer, bread baked with the range and so forth. Everything necessary for such demonstrations was prepared beforehand.

Inside the store was wired up one of each kind of appliance, with a card placed near by, inviting anyone to turn the switch and note the result. In a prominent place, printed in large letters, was a sign bearing the message: "During Experiment Week our clerks are instructed not to approach any person entering the store unless requested by visitors to do so. You are welcome to wander where you will and ask questions. Make yourself at home." In addition to this a number of specially designed pamphlets were placed on small tables in convenient places. People were invited to take one.

The fixtures we removed to a room in the rear of the store, which was fitted up for the purpose. Because it was not possible to place fixtures in a home for a week's trial, certain inducements were offered, in the way of gifts of lamp shades, to all who purchased fixtures up to a certain amount and over.

One other scheme we adopted, but had to drop in the middle of the week, owing to complaints from the police that we were causing an obstruction of the thoroughfare. We hired a room over a store directly opposite ours. In this we rigged up a cinematograph machine. A white window blind was substituted for the green one in our display window. A manufacturing firm with whom we dealt supplied us with two films showing a washing day with the use of an electric washer, and spring cleaning helped out by a vacuum cleaner. In addition, we procured a comic film, and every evening after dark gave a show until as I said, we were stopped by the police.

We certainly got all the publicity we needed. A tremendous number of appliances and fixtures were sent out, and it was amazing how many people kept the machines once they had them in the home.

Everyone worked hard during that week and for some weeks immediately following, but believe me the bookkeeper worked the hardest. The bosses were delighted with the result. They stuck to their word, too, in regard to their business relations, and, while they sometimes differed in opinion, never to my knowledge did they quarrel again, as in the past. To-day the firm is one of the most prosperous in the province.

Lyons sat down amidst hearty applause from the others. Clark promised to give the next talk, and it was arranged that Norton should be the host for the following Saturday evening.

Northern Electric Branches in Hamilton and Windsor

The Northern Electric Company have opened a branch office in Hamilton, in charge of Mr. J. A. Daly. In the very near future they will also be opening a sub-distributing branch in Windsor, Ont.

LAST CALL!

The arrangements for the big
Electrical Meeting in Vancouver
are practically completed.

EVERYTHING IS IN READINESS
to take care of a big Convention

The headquarters will be the
VANCOUVER HOTEL

The out-of-town speakers—
GOODWIN, CHASE,
WAKEMAN and others.

The dates—
Monday, May 31—Tuesday, June 1

As soon as you arrive MAKE YOURSELF KNOWN to President Brettell or Secretary Hargreaves.

Every electrical man is needed at the convention.
Every electrical man needs the convention.

The Electrical Appliance Game is in its Infancy—Many Incidents Show People Are Badly Informed

It is very plain, even to the casual observer that the electrical appliance game is but in its infancy. It is also plain that it is growing so fast that it will not long remain so. The great improvement in the manufacture of appliances; the rapid progress in the education of the people in regard to their need for electrical labor savers; the deliberate sweeping onslaught of appliance salesmen, upon hitherto untouched fields, all point to the fact that the appliance industry is coming to its own.

Could many of our ancestors rise from their graves to see the hard work—which, if it did not shorten their lives, did at least make life a burden for them—overcome by mechanical means, they would surely long to return, if only for a short time, to taste the joys of freedom which such devices have made possible.

Usually the talking points of the average salesman are treated with suspicion, for the simple reason that only too often talking points have to be manufactured. But it is different in the selling of electrical appliances. There are in this business too many actual selling points to necessitate the framing of false ones. There is an old saying which exactly covers the truth of electrical sales talk: "The proof of the pudding is in the eating." Apply that to the points mentioned by the dealer in vacuum cleaners, or washers, or indeed any device, and nothing more need be said.

If the reader will take the trouble to peruse any newspaper, journal or pamphlet dealing with electrical appliances he will be able to summarize the selling points of any device in the following manner. They are:

> Labor savers; time savers; health preservers;
> temper preservers; and they:
> pay for themselves and save money.

What better array of selling points can any dealer wish for. Moreover he does not have to wait long to have the truth of his selling points proven.

What does all this mean? It means simply that the dealer in electrical merchandise has the best selling proposition on the market, because, first: There is more truth than fiction in the value of the goods, and second: He has always a legitimate reason for the apparent failure in operation of any appliance he has sold.

A good illustration of this latter is a story the writer heard recently, of a lady who owned an electric range and complained that her bill for power was much higher than she had been given to understand would be the case. On investigation it was found, for example, that when she wanted to keep the water in the kettle at the boil she turned the current to high and placed the kettle half way over the element, instead of turning the switch to low and the kettle over the whole of the element. This and many more incidents show how through wilfulness or ignorance, many appliances are abused and the blame placed upon the appliance.

The dealer in electrical appliances has simply to believe thoroughly in his goods, and make use only of honest selling points and the appliances will do the rest.

Booklet on Wire Rope and Fittings

The Canada Wire and Cable Co., Ltd., Toronto, have issued an illustrated booklet descriptive of their wire rope and fittings. This gives a short, concise, description of wire rope, its use, methods of manufacture, material used, various types of construction and other information. There is a particularly useful chapter on the "Care of Wire Rope." Users of wire rope will find the booklet of great value.

Salesmen and Salesmanship

A Poor Salesman is a Bad Investment — Three Types of Customer and How to Handle Them—Never Knock a Competitor—The Power of a Timely Suggestion

By Mr. F. C. Brooke*

A great deal of the success of a store depends upon its salesman. A poor salesman will lose for his firm hundreds of dollars in the course of a year. The good one will rarely let a customer leave the store without selling him more than he came for, or at least an article of higher value than he had intended to buy. The good salesman, however, does not become so in a day. There is no such thing as mushroom growth in salesmanship. True, the best salesmen are usually born with the gift, but they must go through a certain amount of training before they can be considered as having graduated.

Knowing the Goods

Like every other profession there are the tiresome days of spadework to be gone through before selling becomes easy or pleasurable. It is not sufficient to know that after a vacuum cleaner is connected to power, by turning a switch and running the machine over a carpet it will remove the dust from the carpet. The prospective customer knows that much. What is necessary is that the salesman should be competent to explain why the machine will take up the dust, how much it will cost to operate; how it will save time, labor, and money. These points are only learned by studying the cleaner, reading up about it, asking questions of those who have the experience and utilizing any other means of acquiring information. The same is true of every article handled by the firm. In short it is necessary to be primed to answer any question asked by a lady who wishes to know what the article will do, or the man who desires to know of what it is made and the manner of its construction. Experience will, in time, teach a salesman what kind of question certain types of customers are likely to ask, and then it becomes almost a matter of routine. At the same time one must guard against developing the "routine" spirit, otherwise the ability to read people will become blunted.

Deportment and Appearance

It should not be necessary to mention that a salesman must dress well, be courteous under all circumstances and never ague with a customer. Unfortunately there are a number who neglect one or more of these points. Needless to say they are rarely found in the most up-to-date stores. A customer will never return, except from necessity, to a store where every consideration has not been shown. The man whose finger nails are in mourning is not the man to occupy the important position of transacting business with a customer.

Sizing Up a Customer

Anyone can take an order, but it needs skill to make and clinch a sale. Next to knowing the goods the most important point is to be able to size up the customer. That is; it is necessary to be able to quickly decide the type of person and the probable attitude he or she will take while the goods are being shown and inspected. The average customer enters a store with the full intention of having his own way. This way is not always for his good. If he falls into the hands of a poor salesman he will leave the store having had his own way, but if on the other hand the salesman is experienced the customer will leave the store satisfied, which means all the difference in the world.

Some customers can be led, while others must be almost driven before a sale can be made. The real salesman will find a way to lead 90 per cent. of his customers.

Gain Customer's Confidence

The first step in handling a customer is to gain his confidence. Without this it is very difficult to make a sale. The experience of one gentleman buying fixtures will illustrate this point. His first visit to the store was a failure. He fell into the hands of a green salesman, and simply walked through the store pointing to the fixtures he decided to take. The salesman simply recorded the order on his pad. In other words the customer sold the salesman. The sale was not clinched at the time and a few days later an experienced clerk was sent to the home of the customer to fix the sale. He immediately pointed out to the buyer that he thought he was purchasing rather poor fixtures for a house such as he owned. The reply was that he had not really seen anything that he cared for, and had simply picked out a few fixtures haphazard. The salesman persuaded him to return to the store and make another choice, at the same time gaining permission to go all over the house and get an idea of the best type of fixtures needed. When eventually the sale was made the amount came to $540 against $124 of the previous sale, and what was the most important thing, the customer was satisfied.

Three Types of Customers

There are three types of customers: the bully who knows everything; the quiet individual who apparently knows nothing; and the person who asks innumerable questions. The latter is the easiest person to sell to. Questions reveal the trend of thought in a customer's mind and a good salesman can speedily size up the situation. The most difficult person to deal with is the quiet individual. With such a person it is necessary to be very tactful and to go slow in arriving at decisions until he reveals what is in in his mind. Under any circumstances a wise salesman will never give away at the first breath all his knowledge of the article in question.

To handle a bully a "heavy" man is necessary. By this is meant the salesman who has been in the game for years and has undisputed ability in handling all kinds of customers. The bully must be attacked with his own weapons and must not be allowed to get in the first blow. Claiming, by his attitude, as a rule, that he knows everything about the class of goods he wishes to buy, he really knows nothing and depends upon his bullying manner to get his own way. A customer of this type went into an electric store to buy fixtures for his drawing room. He choose eight nickle plated bathroom wall brackets, and was very indignant when the salesman refused to take the order. When questioned why, the clerk explained that he was not going to have the firm advertised as giving such poor service. "Your friends," he said, "would realize that such fixtures were altogether out of place and on enquiring the name of the firm that installed them would get a very poor idea of that firm's qualifications and honesty." The gentleman realized the truth of this and allowed the salesman to do the suggesting. The result was that he went away fully satisfied and with confidence in the salesman's judgment.

---

*[illegible]

If a salesman can convince a customer that his knowledge of the goods he is selling is greater than that of the customer he can make a sale almost every time.

Never Knock a Competitor

One important thing to avoid is knocking the goods of a competitor. Nearly every customer will in the course of a sale bring in for comparison the goods of another firm. This must be ignored as much as possible and the customer led away from such dangerous ground. If, however, he persists in referring to the matter the salesman must never speak disparagingly of the article under discussion. An old maxim which says "A knock is as good as a boost" is especially true in salesmanship. Comparisons are just as odious in sales talks as in any other phase of life.

In the case of a customer who enters the store with the remark "I am going to buy a few fixtures here and a few somewhere else, the only way to handle him is to go after him in the spirit of: "we have the best goods on the market and can fill any order that you care to give us," and point out to him how much better satisfaction will be the result, and how much money will be saved by purchasing at one place. Then convince him that the firm with whom he is at present dealing can give him the best satisfaction, and save him the most money.

A suggestion timely placed will often result in a sale. A salesman had just made a sale of a washer and as the purchaser was leaving the store the salesman called him back and asked why he did not complete the outfit by purchasing an ironer. The answer was that he had an electric iron. It was explained to him that this was not the kind of iron meant, and the latest ironer was shown to him. When he left the store he was the owner of an ironer as well as a washer. Such methods won't work every time, but they will never work if not applied.

Clinching a Sale

Clinching a sale is again but a matter of sizing up the customer and convincing him that his knowledge is not as great as that of an experienced salesman. Sometimes taking the attitude that the sale is entirely a matter of indifference, will decide him to buy. With others eagerness to sell will help on the decision, but care must be taken to make certain of the class of person being handled, otherwise the sale will be lost and many more besides.

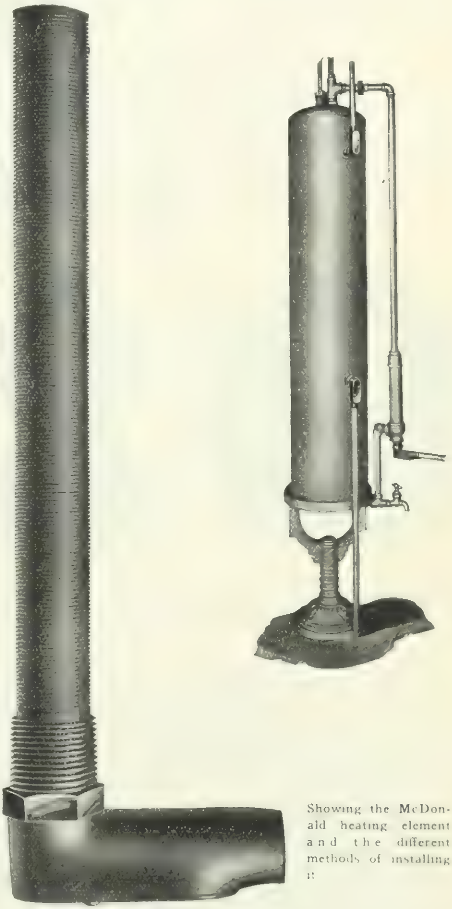
When all has been said for salesmanship that can be said, it boils itself down to this; it is commonsense scientifically applied, and no man is going to make a success of it, whether with the gift or not, who loses sight of this fact What few rules there are, are simple and easily learned and the rest is experience, enthusiasm, and belief in the lines handled, the service rendered and the firm worked for.

New Store St. Clair Avenue

A new electrical store has been opened at 1108 St. Clair Ave., Toronto, Ont., by W. R. Chester. The store will be known as "The Household Electrical Appliance Co." Mr. Chester, until recently, lived in Owen Sound, Ont., where for many years he was in the dry goods business. He has, however, transferred to the electrical appliance business because he believes there is a big future in it. At present he is featuring the Apex washer and the Eureka vacuum cleaner. Later a stock of every kind of appliance will be added and the most up-to-date methods of salesmanship utilized to get the public interested in such necessary articles. Mr. Chester intends to fit up a room in the rear of the store as a laundry for demonstration purposes. He proposes to have dirty clothes actually washed in this room, and invite people to watch the process. A crew of canvassers will be sent round the city introducing the lines stocked. Considering that Mr. Chester has not been in the electrical business before, the methods of advertising he has already planned out speak well for the future success of his venture.

The McDonald Water Heater

In our last issue we made mention of a new type of water heater being manufactured by the Canadian General Products Co., of Brantford. We are now able to illustrate this equipment and to describe it in somewhat greater detail. The heater consists of an enclosed brass cylinder about 10 in. long, or just a little less than the diameter of a 30-gallon tank. Within this cylinder the heating element is enclosed, which consists of nichrome wire wound on a cylinder of alberene stone. The terminals of the heating element are solidly connected with the leading wires,, so that all possible trouble within the element is eliminated. The unit threads into the side of the tank through the openings nor-



Showing the McDonald heating element and the different methods of installing it mally left for pipe connections. The installation of the unit, therefore, simply consists in inserting the element, after the removal of the pipe or plug. The construction of the unit is better shown in the illustration.

The current consumption of this element is 6 amps or on a 110 volt circuit 660 watts. It can thus be attached to an ordinary lighting socket. Where this is not considered sufficient capacity, a second element, or if necessary a third or fourth, can be installed at other openings in the tank. The same equipment may also be used as a circulating element, though naturally the efficiency is not so high. The strong features of the equipment seem to be that there is nothing to get out of order, that it is easily installed, and that it is practically 100 per cent. efficient.

This heater is the invention of Mr. J. A. McDonald, Mr. McDonald was for a number of years with the Canadian Westinghouse Co., but latterly has spent considerable time in developing his new unit.

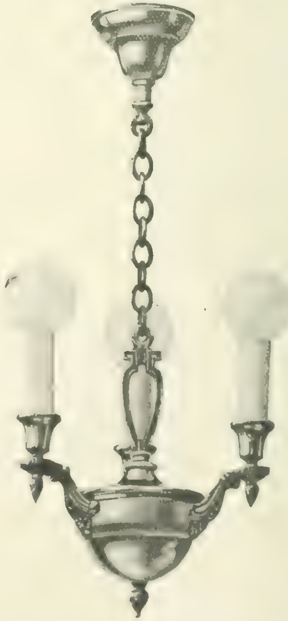
Vucuum Tube Type Electrostatic Glow Mete

Indication of potential, ground detection, and synchronism indication are the three uses to which a recently developed electrostatic glow meter can be placed. This device which is manufactured by the Westinghouse Electric & Manufacturing Company, consists essentially of three vacuum tubes. When used as a ground detector or potential indicator the device is connected so that one of the bulbs is in parallel with the bottom section of each of the three insulator columns. When used for synchronizing between a bus and a line or between two lines or two busses the glow meter is connected as follows: The phase connections through one of the bulbs are made such that it will not glow at synchronism. The phases of the two lower bulbs are crossed so that they will glow at half brilliancy at synchronism. When out of synchronism there will be an apparent rotation which will be an indication as to whether the incoming line is fast or slow. For switching those instruments, small oil switches may be used so that it is possible to use one glow meter for a number of purposes, that is if enough oil switches are provided. The base on which the apparatus is mounted is of micarta insulation. The small bulbs are filled with a rare gas which has the property of giving forth a vivid orange-red glow on an extremely small static discharge. They are mounted on spring clips and are separated from each other by micarta tubing.

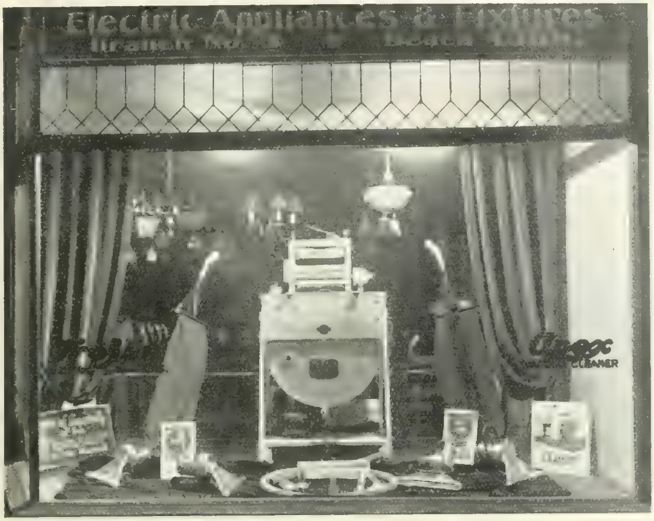
The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a circular entitled, "Marine Equipment in the Fabricated Ship" which describes and illustrates geared-turbine machinery for the 9,000 deadweight ton cargo boats built by the Merchant Shipbuilding Corporation.

New Elecrtric Iron with Steel Clad Element

One of the features of the electric iron recently placed upon the market by the Westinghouse company is the practically indestructible steel-clad element. This steel-clad element makes for even distribution of heat at all times, something that is necessary for the production of good work with a minimum effort. In addition, this iron was designed to have a pleasing appearance as well as durability of construction. It has graceful lines, beauty of finish, and a durable and handsome cord. On account of the bevelled edges on this iron it is an easy matter to iron delicate fabrics. A comfortable, perfect fitting handle obviates the tiredness which is often the after effect of a day of ironing. All parts of this iron are easily accessible for servicing.



Three light candle fixture, spun body, cast arms and large cast chain loop Length 28 inches, spread 11 inches. Bright Flemish finish.. Shown by Nerlich & Co.



The two branch stores of McDonald & Willson are in charge of Mr W. H. Cheadle. This is a photo of the Queen St. East store, where fixtures and a full stock of appliances are carried.

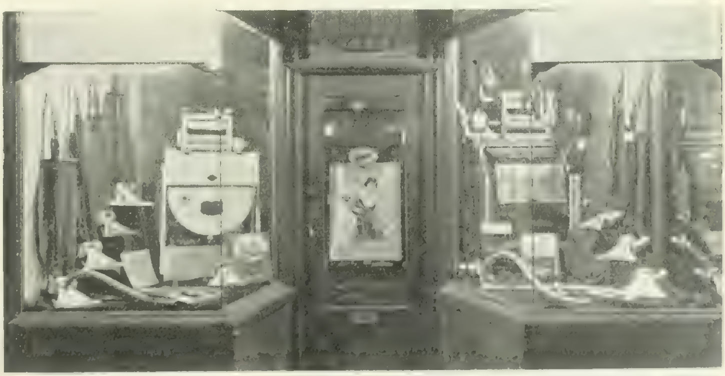
McDonald & Willson Have Three Fine Electrical Stores in Toronto

In addition to their main store on Yonge Street, Toronto, Messrs. McDonald & Willson have two branch stores in the city, one at 407 Roncesvalles Ave., and the other at 1984a Queen St. E.

The Roncesvalles branch is given over entirely to the sale of washing machines, ironers, and vacuum cleaners. From this store a crew of canvassers work the city. Both windows give a display of vacuum cleaners and their parts, and washing machines. The floor of the left-hand window is covered with a green plush cloth, and the right-hand window with a purple plush. In the back of this latter window is a fine rubber plant which gives an added attraction to the display. Several cards point out the various good qualities of the appliances.

The Queen St. branch is stocked with every kind of electrical appliance. The window display, however, is given over entirely to vacuum cleaners and their parts, and a washing machine. In this window the cards are illustrated.

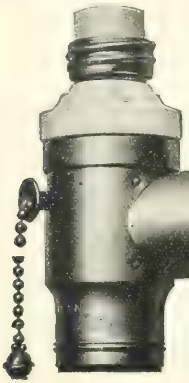
Green plush curtains hang in the rear of the window, and a cloth of the same color and material covers the floor. The window is plain but attractive.



This is the Roncesvalles store. Washing Machines and Vacuum Cleaners are specially featured.

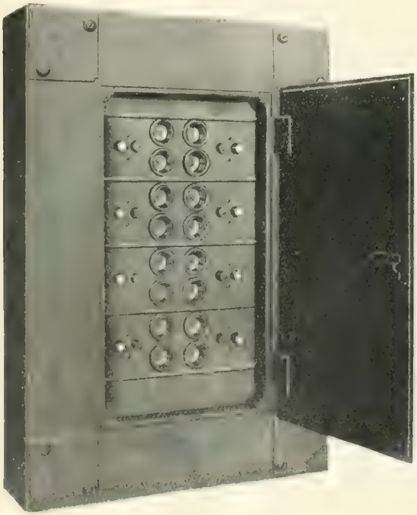
Double Duty Socket With Pull Chain Control

A pull chain extension socket with two Edison screw base outlets has been placed on the market by the Bryant Electric Company, Bridgeport, Conn. It has an Edison screw base, a lower socket and a side socket. The lower socket will carry 250 watts at 250 volts and will take a standard shade holder without interfering with the use of the side socket. The side socket will carry 660 watts at 250 volts, and will take any standard Edison type screw plug. The current is always turned on in the side socket, while a pull chain controls the lower socket. When the socket is attached to a rigid fixture, the lamp and shade on the lower socket will retain the same position as they would if there were no side outlets. The Northern Electric Company, Limited, are sole Canadian distributors for Bryant material.



Push Button Safety Panels

Krantz Type "C" push button safety panels are made up of push buttons and plug fuses, and all parts accessible are electrically dead so that the operator is in no danger of getting a shock in turning the lights on or off. Each pair of buttons, with their fuses, constitutes a unit. Should a switch become damaged, all that is necessary is to remove the switch cover section and unscrew the defective part, without disconnecting any wires, exposing other switches, or removing the panel from the box. By reason of its construction, this panel is said to be the narrowest safety panel on the market and the only one of its capacity that can be furnished with a safety type main switch, if desired. The panels are made for two or three-wire systems, and for from 2 to 32 branch circuits. The capacity of the main ranges from 30 to 200 amperes, 125 volts, and the capacity of each branch circuit is 10 amperes.



Dominion Engineering Works

The Dominion Bridge Company has announced the inauguration of another important industry for Canada in the manufacture of water wheels and other hydraulic machinery such as is used by large hydraulic power companies. It will be known as the Dominion Engineering Works, Limited, which the Bridge Company will control, to be capitalized at $10,000,000 equally divided between common and preferred stock of which $100,000 of each will be presently issued. It is announced that the following names will be included on the board of the new company: Sir Herbert Holt, president Montreal Light, Heat and Power Company; Geo. Chahoon, Jr., president, Laurentide Company; Julian C. Smith, general-manager and chief engineer, Shawinigan Water and Power Company; Howard Murray, vice-president, Aldred and Company; H. Birchard Taylor, vice-president, Wm. Cramp and Sons, Ship and Engine Building Company.

Mr. G. H. Duggan, president the Dominion Bridge Co. in a statement to the shareholders says: The Dominion Engineering Works, Limited, will enter into an agreement with the Wm. Cramp and Sons' Ship and Engine Building Company, for the exclusive use in Canada and the British Empire of its designs for water wheels and other hydraulic machinery. The water wheels department of the Wm. Cramp Company has constructed most of the large water wheels in Canada, aggregating 658,000 h.p., including 101,000 h.p. for the Montreal Light, Heat and Power Company; 137,000 h.p. for the Shawinigan Water and Power Company and 120,000 h.p. for the Laurentide Company.

Protect Against Lightning

Though electric storms reach their highest frequency during the heat of summer, they often occur in the spring, and fire losses caused by lightning are by no means unknown in April and May.

Lightning rods have proved an almost absolute protection. Only in very rare instances have they been known to fail, and, even in these cases, the failure was probably due to defect in installation or to deterioration.

Examine your lightning rod installations for broken insulators, for bends in the cable which allow contact with the framework, or for corrosion where it enters the earth. The latter is an important point. The electricity is carried into the ground by means of the cable but, if it corrodes, and the ground connection is thereby broken, a fire is very liable to result. See to it that the cable is sound and is deep enough in the ground to always be in damp earth.

When building wire fences it is advisable to use ground wires about every five rods. Lightning is attracted by wire fencing and as, during a storm, animals will congregate near fences, many of them are killed by contact with the wire. These ground wires may be of about No. 9 gauge wire, given one turn around each strand of the fence, and carried into the earth beside the fencepost. Conservation

Current News and Notes

Brantford, Ont.

The city is taking up with the government the question of extending the radial from Erin to Cainsville. The stretch from Brantford to Cainsville is to be paved as part of the provincial highway, and it is urged that the work of track laying must proceed now or cause endless trouble and expense afterwards.

Messrs. Robbins & Myers Co., Ltd., Brantford, Ont., have recently purchased six acres of farm property from the Water Commission for the purpose of enlarging their plant.

Brussels, Ont.

The town council of Brussels, Ont., contemplate installing a hydro-electric system.

Buckingham, Que.

The St. Joseph's R. C. Church are contemplating the erection of a new church at Buckingham, Que. The parish priest, Rev. Father J. Chatelain, wants prices on electrical fixtures and supplies, also catalogues

Brockville, Ont.

At a sitting of the Ontario Railway and Municipal Board, recently, at Brockville, Ont., authority was given the Leeds and Grenville Independent Telephone Company to increase its rates from ten to fifteen dollars per annum. The application of the company, which operates 168 miles of line, was based on the necessity for renewals to plant and on the insufficiency of the present revenue to meet the demands. It was shown also that the company had paid only one dividend in twelve years.

It is reported that hydro power will cost Winchester and Chesterfield $76 per horse-power this year.. The Beach estate is offering to furnish power at a lower rate.

Calgary, Alta.

Messrs. Parker Chase Co., Calgary, have been awarded the contract for electrical work on the new warehouse of Crane Ltd., to be erected on the corner of 11th Ave. and 5th St., Calgary, Alta.

Danville, Que.

The ratepayers of Danville, Que., have passed a by-law authorizing the installation of an electric lighting plant in the town. Prices are wanted on copper wire, meters, transformers, cross arms, insulators, street lights and fixtures.

Edmonton, Alta.

The Hellas Electrical Co., 10823 Jasper Ave., Edmonton, Alta., has been awarded the contracts for electrical work on new stores and offices of Messrs. Pheasey & Batson; three new stores for the Edmonton Hide & Fur Co. on 101st St.; and addition to Empire Block, corner of Jasper and 1st Sts.; all in Edmonton, Alta.

Mr. H. G. Macdonald, 612 Tegler Block, Edmonton, general contractor for the new biscuit factory to be built on 102nd Ave., Edmonton, will sub-let electrical work. Tenders will be called for 2-100 kw. generators and installing of same.

The by-law for suggested extension to power plant at Edmonton, Alta has been defeated

A new warehouse is being erected on 104th St., Edmonton, Alta., at a cost of $250,000. The general contractors, Messrs. J. McDiarmid Co. Ltd., Nokomis Bldg., Winnipeg, or the owners, Messrs. Revillion Freres, 104th St., Edmonton, will sub-let the electrical work.

The Hayward Lumber Co., 11904 73rd St., Edmonton, Alta., are building a new power house at Edmonton

Guelph, Ont.

Announcement has recently been made that the Federal Signs System of Chicago, manufacturers of electric signs and electric washing machines, will establish a factory in Guelph at an early date and will employ 100 men. Until the plant is erected the product of the firm will be manufactured by the Canadian Metal Products Company.

Grand Mere, Que.

It is reported that the Laurentide Power Co., Grand Mere, Que., will make an addition of two more turbines and generators of 20,000 h.p. each, at their River St. Maurice plant.

Halifax, N. S.

Messrs. Arthur & Conn, Argyle St., Halifax, N.S., have been awarded the contract for electrical work on the new Anglican Church, Kaye St., Halifax, N.S.

Kitchener, Ont.

It was announced recently that 1,000 additional horsepower had been allotted by the Hydro Commission to Kitchener, Ont. The city is still short 3,500 horsepower, which is said to be needed for industries.

Kingston, Ont.

The Civic Utilities Commission of Kingston, Ont., have been promised another 500 h.p. by the Hydro-electric Commission.

A new memorial hall is being erected by the Anglican Church congregation on Union St. W., Kingston, Ont. Tenders for the electrical work should be addressed to the general contractor, Ald. Litton, 52 Frontenac St., Kingston, Ont.

London, Ont.

The electrical work on the new Landmarck Lodge Bldg., London, Ont., will be let. Architect, Mr. W. G. Murray, Dominion Savings Bldg., London, Ont.

The Copp Syndicate will let the electrical work on 10 residences on Gerrard Ave., London, Ont. All communications should be addressed to the seceretary, Mr. A. M. Hart, Dominion Savings Bldg., London, Ont

Mundare, Alta.

A by-law has been passed at Mundare, Alta., enabling the town council to install a new electric lighting system.

Montreal, Que.

Mr. Ad. Poirier, 343a De Lanaudiere St., Montreal, Que., will let the electrical work on 24 tenements at Sherbrooke St. W. Montreal.

Mr. J. A. Gagnon, 1337 Wellington St., Verdun, is erecting a departmental store in Montreal at a cost of $100,000. The architect, Mr. C. Beauchamp, 26 St. James St., Montreal, will shortly call for tenders for the electrical work.

Mr. F. J. Smith, 472 Prud'homme Ave., Montreal, Que., has been awarded the contract to wire the new branch of the Royal Bank of Canada, at 500 Sherbrooke St W., Montreal, Que.

Electric Ltd., 22 St. John St., Montreal, Que., have been awarded two contracts by Service Tobacco Shops Ltd., for electric wiring stores on Peel and Craig Sts., Montreal.

The Montreal Tramways Co., 78 Craig St. W. Montreal, are building a new sub-station on Cote St.

Moncton, N. B.

The G. Johnson Co. Ltd., Hubway Block, Moncton, N.B., has been awarded the contract for electrical work on the alterations to an hotel on Main St., Moncton, N.B.

Mr. R. M. Rive, George St., Moncton, N.B., general contractor for a new boarding house on Church St., Moncton, will sub-let the electrical work.

Montreal West, Que.

The secretary-treasurer of the Montreal West Town Council has called for tenders for installing a complete underground system of wiring, with standard posts and lamps, for lighting all streets.

Niagara Falls, Ont.

Messrs. Beattie, McIntyre Ltd., 72 Victoria St., Toronto, Ont., have been awarded the contract for electric wiring the new Technical High School at Niagara Falls, Ont.

Ottawa, Ont.

The Ottawa Housing Commission are building residences to the amount of $700,000. Mr. H. L. Allen, 272 Bank St., Ottawa, Ont., has received the contract for the electrical work.

Orillia, Ont.

The Orillia Water, Light & Power Commission will shortly reconstruct the power line from Orillia to Swifts Rapids, Ont.

Preston, Ont.

The Metal Shingle & Siding Co. Ltd. are erecting a new factory at Preston, Ont. The manager, Mr. J. G. Loniman, will sub-let the electrical work.

Peterboro, Ont.

A resolution asking the Government to transfer to municipalities the Central Ontario Power system was recently passed at a meeting held in Peterboro, Ont., by representatives from several neighboring towns. It is proposed to submit the project to the ratepayers of the municipalities interested. If the transfer is carried out the operation of the scheme will remain with the Hydro Commission.

Messrs. Miller, Powell & Watson, 438 George St., Peterboro, Ont., have been awarded the contract for the electrical work on the new school at Monaghan Pond, Peterboro, Ont.

Petrolea, Ont.

Electric equipment will be installed for operating machinery in the new factory of the Draper Mfg. Co., Petrolea, Ont.

Prince Rupert, B. C.

Messrs. Patterson & Ling, Prince Rupert, B. C., have tendered a price of $3,840 for the electrical work on the new school at Prince Rupert.

Parkhill, Ont.

Hydro-electric power was turned on at Parkhill, Ont., on Monday night, May 4th. For two years this town has been without lights in the streets.

Quebec, P.Q.

The town council of Ange-Gardien, Que., are contemplating installing five miles of power transmission line.

Regina, Sask.

The city council, Regina, Sask., recently voted $54,310 for materials for the proposed extensions to the city electric light and power plant for the current year. Contracts have been awarded to the Canada West Electric Ltd. and Whiteford Bros.

Sherbrooke, Que.

Mr. Chas. J. Desbaillets, Room 15, Whiting Block, Sherbrooke, Que., is the electrical engineer for the repairs on the Weedon dam.

Stratford, Ont.

The Stratford, Ont., public utilities commission have secured an additional 160 h.p. from the Hydro-electric Commission.

Sault Ste. Marie, Que.

The contract for electric wiring the new hospital at Sault Ste. Marie, Que., has been awarded to Mr. Odilion Roberge of that town.

The Algoma Steel Corp., Sault Ste. Marie, Ont., are making extensions to their structural steel plant at a cost of $7,000,000. The contract for the main mill motor drives and d. c. motor has been awarded to the Canadian Westinghouse Co., Hamilton, Ont. The Canadian General Electric Co., Toronto, will supply and install the a.c. motor equipment.

The Labor Temple Assoc., Ltd., at Sault Ste Marie, are contemplating the erection of a new Labor Temple. The purchasing agent, Mr. Geo. Carufel, 137 Tancred St., Sault Ste. Marie, will purchase all electrical fixtures and supplies.

Mr. O. C. Carney will build and occupy an electrical store on Queen St., Sault Ste. Marie. The business will be known as the Electrical Supply Store.

Sudbury, Ont.

Tenders have been called by the sec.-treas. of the Sudbury, Ont., school board, for electrical work on the new additions to the Elm St. School.

Tenders have been called for electrical work on the new high school on College St., Sudbury, Ont. Architect, Mr. P. J. O. Gorman, Sudbury.

St. Thomas, Ont.

The city council of St. Thomas, Ont., has received the consent of the Ontario and Railway Board to adopt one man pay-as-you-enter street cars, and also the consent of the Dominion Board to operate over the railway crossings on condition that certain safety measures are adopted.

Imperial Oil Ltd., will let the contract for electrical work on their new warehouse and offices to be erected at St. Thomas, Ont. Toronto Superintendent, Mr. Henbert, 56 Church St., Toronto; London Supt., Mr. Chas. McGuire, care of Imperial Oil Ltd., London, Ont.

Toronto, Ont.

The Hydro-electric Power Commission are building an addition to the West Toronto sub-station at the corner of Ruskin and Edwin Streets.

Messrs. F. & A. E. Ham, 85 Salem St., Toronto, contractors for the new Salvation Army barracks on Dufferin St., Toronto, will sub-let the electrical work.

Mr. T. E. Essery, Confederation Life Bldg., Toronto, Ont., general contractor for the new manufacturing building at the corner of Spadina and Grange St., Toronto, Ont., will let the electrical work.

The Private Bills Committee of the Ontario Legisla-

ANNOUNCEMENT

ENAMELLED WIRE

We are pleased to announce that, at the request of a number of customers, we are installing a complete equipment for the manufacture of Enamelled Wire which we plan to have in operation by the end of May.

As this is a new departure as far as Canada is concerned we are sparing no expense to ensure this material being manufactured as well as is known to the Art.

Eugene F. Phillips Electrical Works
Limited

Head Office and Factories - MONTREAL

[illegible] the bill for the proposed construction of the Mt. Pleasant [illegible] line, Toronto, Ont., by a vote 20 [illegible] was carried that the question be submitted to the ratepayers.

It is reported that the Hydro-electric Commission of Ontario have secured the necessary authority to construct the electric railway line from Port Credit, through Hamilton to St. Catherines, Ont. The right of way for the line is being secured.

Messrs. Norman McLeod Ltd., Kent Bldg., Toronto, Ont., general contractors for the additions to the vault buildings of the Bank of Commerce, on Atlantic Ave., Toronto, have called for tenders for the electrical work.

The Hyelectric Fixture & Wiring Co., 261 College St., Toronto, Ont., has been awarded the contract for electric wiring the extensions to the Waverley Hotel, Spadina Ave., Toronto.

Vancouver, B. C.

Messrs. Robertson & Partners, Metropolitan Bldg., Vancouver, B.C., have been awarded the contract for the new Administration and Dining Block of the Boy's Training School at Coquitlam, B.C. They will sub-let the electrical work.

The Fraser Valley Milk Producer's Associaton are building a new milk condensory at Abbotsford, B. C. Messrs. Sloane & Harrison are the general contractors and they will sub-let the electrical work.

A new cattle barn will be erected in Hastings Pk., Exhibition Gardens, Vancouver, B. C., at a cost of $80,000. The electrical work will be let.

Victoria, B. C.

The Carter Electric Co., 615 View St., Victoria, has been awarded the contract for electric wiring the new Willows St. School, Victoria, B. C.

Welland, Ont.

The contract for the electrical work on the new school, Duncan St., Welland, Ont., has been let to Mr. J. H. Withers, 129 Regent St., Welland, Ont., for $755.

Windsor, Ont.

Mr. H. Jones, 101 London St. W., Windsor, Ont., will let the electrical work on 9 residences, to be erected on Louis Ave., Windsor.

Winnipeg, Man.

The Star Electric Co., 191 Portage Ave., Winnipeg, Man., has been awarded the contract for electrical work on the new Nurses Home, Riverview, Winnipeg.

The contracts for the Sherbrooke St. sub-station of the Winnipeg Electric Railway have been awarded. The Canadian General Electric Co., 148 Notre Dame Ave., Winnipeg, Man., will supply the transformers.

Messrs. MacDonald and Willson Lighting Co., 309 Fort St., Winnipeg, Man., have been awarded the contract for electric wiring and fixtures, for two double cottages on Macdonald Rd., Tuxedo, Man. Also the electrical work on the new clubhouse of the Canadian Cement Co. Ltd., at Tuxedo, Man.

Weyburn, Sask.

The provincial government of Saskatchewan are erecting a new mental hospital at Weyburn, Sask., at a cost of $1,492,396. The contract for electrical work has been awarded [illegible] St., Moose Jaw, Sask.

La Compagnie Electrique de St. Vital, Limitee, is a new company incorporated, with head office at Lambton, Que. They will carry on a wholesale and retail business in electric machinery and apparatus. Capital $49,900.

Miscellaneous

The Moose Jaw Pioneer Electric Co., Ltd., has been incorporated with head office at Moose Jaw, Sask. Capital, $25,000.

The Moose Jaw Gas & Electric Co., Ltd., has been incorporated with head office at Moose Jaw, Sask. Capital, $25,000.

The Greendale Light & Power Co., Ltd., has been incorporated with head office at Moose Jaw, Sask. Capital, $20,000.

Mr. H. W. Rafuse of Truro, N.S., has recently taken over the electrical business of W. H. Conn, Inglis St., Truro, N.S. The new firm will be known as the "Universal Electric Co."

The Wagner Electric Manufacturing Company, of St. Louis, announce the removal of their Pittsburgh office to 530-534 Fernando St., to continue in charge of Mr. Ludwig Hemmel.

The name of the St. Maurice Light & Power Company has been changed to that of the Electric Service Corporation. The powers of incorporation gives authority to purchase and operate the plant of the Shawinigan Electric Light Co.

Complete Use of Electric Appliances, Like Charity, Should Begin at Home

First an artisan, then a contractor operating from his home, and finally a contractor-dealer with a store are the steps taken by many dealers who are running stores today. Some are successful and many are not. There must be some good reason for this besides the fact of location. The ambition of the average contractor-dealer is, quite properly, to get a store on the main street, but the main street location will not alone make the success of a business. There are a few general rules which largely govern the successful growth of a store's turnover and the following helpful suggestions have been offered by one competent to advise. He suggests that first of all a dealer intending to start in business for himself should thoroughly electrify his own house. This almost seems a superfluous suggestion, but as a matter of fact a tradesman is usually the last to make use of his own trade to beautify his own home. He knows the uses, more or less, from the installations he has made in the homes he has wired, but this may not so readily teach him the good or bad points of the various fixtures, sockets, outlets, etc., which he has installed. Then, too, by having actually used every modern appliance he will the more fully appreciate their value and the value of wisely placed outlets and receptacles. Afterwards when selling the various appliances or wiring a house he will be able to advise his customers not merely from commonsense theorizing but from actual knowledge of the value of the products he offers for sale. It will also help him to arrange his store when he opens up. He will better appreciate the appeal of attraction.

One other very pointed suggestion is quoted in full: "Before entering upon the duties of retail merchant, the electrical contractor-dealer should first sell himself on the complete electrical equipment. He should be sold on the advantages of using electricity. He should be sold on the wide ranges of its uses. He should be sold on its great convenience when properly conveyed to the user. He should be sold on its adaptability to residence, store, and factory usuage. He should be sold on the almost endless number of useful electrical appliances, devices, appurtenances, and contrivances which the master mind of man has invented for the purpose of saving time, trouble and temper. Having sold himself, he will find it easier to sell to others."

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 309 Broadway
CHICAGO - - Room 803, 63 E. Adams St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, June 1, 1920 No 11

Electrical Industry Hard Hit by New Tax

The new tax budget of Sir Henry Drayton seems to have been specially designed to handicap the electrical business and more particularly the retail end of it. In addition to that there is no visible discrimination, so far as the customer is concerned, between the man who requires electric furniture for his "shack" and the wealthy financier whose income runs into the tens of thousands. For example it is the ruling of the Commissioner of Taxation that all plated electrical appliances for household use are taxable. This means that an iron is a luxury not intended for a poor man, neither must he indulge in toast, coffee or a vacuum cleaner. In short the budget says "Any attempt to relieve the drudgery of house work must be heavily taxed." Neither can the poor man enjoy the convenience of lighting fixtures in his home, however simple they may be. He must go back to the coal oil lamp—or pay a tax. Looked at from the most favorable angle the new tax, so far as the retail end of the industry is concerned at least, will have the effect of blocking all progress and will operate to put us back where we were ten years ago.

It is little wonder that the industry as a whole is already very much disorganized as a result of the most unexpected and entirely unreasonable attitude of the Dominion Minister of Finance towards it. Deputations from various points are visiting Ottawa to explain the situation and endeavor to obtain relief but it seems scarcely possible that Sir Henry was not fully seized of the situation before making his announcement. It must be remembered that quite recently he was Canadian Power Controller and as such must necessarily have formed an intelligent estimate of the scope of the electrical industry and of its functions. Is it not even natural to expect that his sympathies, if he allowed them to operate, might almost have influenced him towards leniency. At least one would have expected him to be fair. What is so difficult to understand, is the apparently deliberate handicap he has placed on the industry.

Electric Service on the Farm A Certainty of the Near Future

In this issue considerable space is given over to a discussion of the use of electricity on the farm and the extent to which the arguments that have been urged in its favor have been justified by actual experience. It is very gratifying to know that practically all the experiences have been favorable and if this can be said so early in the history of the application, we feel quite certain that improvements in the equipment, which will naturally follow as we gain experience, must in a few years establish electric plants among the essentials in the farmer's mind, just as much as are today his telephone, his motor car, his tractor, or even his regular farm implements, like the self-binder, the mower, the hay tedder and the rest of them.

It is an indication of great confidence in the growth of the isolated plant industry that we already have so many different types to choose from. As I write this, I have a list before me of over seventy U. S. manufacturers who are in the market to sell electric farm plants. In Canada, the number is not so great, naturally, and the equipment offered is not, as yet, "Made in Canada," but this no doubt will be quickly remedied as the demand develops.

There is no reason to think that small isolated plants cannot be made both fool-proof and trouble-proof. It is merely a matter of expense. The completely automatic plant is, practically speaking, as little trouble as if current were taken off the transformer of the central station. But the non-automatic plant costs less money and, if there is anyone about the establishment with a mechanical turn, give surprisingly satisfactory results. Quite often the farmer already owns a gasoline engine and it thus becomes a simpler operation to get him to purchase an electric generator and switch board. In all probability, however, this is merely a transition stage and it will follow that the non-automatic electric plant, like the manually cranked motor car, will give way to the easier and more scientific arrangement.

The fact remains, however, that the farmer, and the farmer's wife, are taking kindly—as they should—to the idea of having more brightness and less drudgery about the home. It will make it easier—also less essential—to keep "help," and it will be another inducement to keep the boy and girl from quitting the farm and the production of real wealth and rushing off to the cities which are already much over-crowded.

Ontario Hydro Will Install Steam Auxiliary Without Delay

Since our last issue went to press in which we again urged the necessity of a steam reserve to take care of the power situation and the inevitable peak shortage of next winter it has been announced by the Ontario Commission that such a reserve will be installed. Presumably steps have already been taken to secure equipment and no doubt the work will be rushed with all possible speed. What with labor troubles, mounting costs and natural delays in deliv ery of materials the prospects are not improving for the completion of the Chippewa plant within the date named.

Next to the importance of placing the order for equipment is the choice of location. The city of Toronto, as the point of biggest demand would naturally work out satisfactorily especially on account of its location with regard to the coal supply. But the cost of a site may prove too heavy or it may be considered wiser to locate the plant more centrally. The whole situation will doubtless be considered on its merits so that all the municipalities may feel that some of the advantage is theirs.

The first consideration, without doubt, is to get the plant "going." It is to be hoped the commission will not lose a moment's time getting its plans under way.

Old Time Telegraphers' Re-Union

The Old Time Telegraphers' and Historical Association, at its annual re-union for 1919, held at Cleveland, Ohio, last September, decided to hold this year's gathering in Canada, and selected the City of Toronto as the place of meeting, Mr. Geo. D. Perry, general manager of the G. N. W. Telegraph Co., being elected President. At a meeting of the Toronto Committee having the preliminary arrangements in hand, Mr. Thos. C. Fleming, of New York, secretary and treasurer of the association, being present, Aug. 31 and Sept. 1 and 2 were chosen as the dates for the coming re-union.

The Old Time Telegraphers' and Historical Association has met but once before in Canada since it was organized in 1860, that being in 1901, when it held its re-union in Montreal. A record not only for attendance, but also for hospitality and good-fellowship, was set at that time which admittedly has never been surpassed in the Association's history, but the Toronto Old Timers intend to make the 1920 gathering equal, if not excel, that held in the eastern city 19 years ago. To this end they purpose soliciting the co-operation of every telegrapher and ex-telegrapher in the Dominion who may be eligible for membership. The requirements for this, as set forth in the form of application for membership, are as follows:

"Any person in good standing who, 25 years prior to the date of making this aplication, was employed in the Telegraph Service and thereafter for five years, shall upon payment of $2.00 (an initiation fee of $1.00 and annual dues of $1.00) be eligible to membership."

Much interest has already been manifested by the telegraph fraternity all over the United States, as well as throughout Canada, in the approaching re-union in Toronto, and as this has the added attraction of falling in the first week of the annual Canadian National Exhibition there is every expectation of a large attendance of members and their families. Extensive and elaborate arrangements are being planned for the entertainment and comfort of the visitors.

The Joint Conference Committee

The Joint Conference Committee of the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers and American Institute of Electrical Engineers has issued a call to the engineering organizations of the United States for an organizing conference to be held at Washington, D. C., on June 3rd and 4th, 1920. This action is taken pursuant to the following resolution unanimously passed January 23rd, 1920, at a joint meeting of the governing boards of the above named societies and of the American Society for Testing Materials, which constitute the member-societies of Engineering Council, also of the trustees of United Engineering Society and members of Engineering Council:

> "Whereas, this conference of national engineering societies has considered the recommendations of the joint Conference Committee of the Four Founder Societies, therefore, be it
>
> "Resolved, that the conference adopts in principle that report and requests the Joint Conference Committee to call, without delay, a conference of representatives of national, local state and regional engineering organizations to bring into existence the comprehensve organization proposed."

The purpose of the conference is to secure the cooperation of engineering and allied technical organizations to further the public welfare wherever technical knowledge and engineering training are involved and to consider matters of common concern to these professions. All engineering organizations whose chief object is the advancement of the knowledge and practice of engineering and the allied technical arts and which were not organized for commercial purposes are expected to send delegates.

Annual Meeting The Electric Club of Toronto

The annual meeting of the Electric Club of Toronto and the last of the season was held in the Mossop Hotel on May 14th. The report submitted by the Honorary Secretary, Mr. H. H. Couzens, indicated that the membership during the past year had shown a healthy growth and is now over 260. The Honorary Treasurer, Mr. C. H. Hopper, also gave a splendid account of his stewardship in the form of a very substantial bank balance.

An interesting item on the programme was the presentation to Mr. P. A. Borden, accompanied by the hearty appreciation of the members of the club, of a small table lamp. Mr. Borden had supplied and operated the projection lantern throughout the season and had placed the members under so much obligation that they were anxious he should have some slight visible evidence of the fact.

The guest of the club was Mr. S. C. DeWitt, who gave the members a delightful story of a recent "walking holiday" he had taken in the Gaspe Peninsula, Quebec. The views shown by Mr. DeWitt were excellent and very much admired. The speaker's brief raconte of incidents by the way also gave the club members a good insight into the habits and characteristics of the inhabitants of the peninsula.

The nominating committee which had been appointed at a previous meeting to prepare a list of officers for next season brought in a report which was unanimously adopted. The nominating committee consisted of Mr. G. Hogarth, chairman, and Messrs. R. A. L. Gray, G. C. Storey, G. G. Cousins, J. H. Martin, W. R. McRae.

Following are the officers: President, Geo. D. Perry; vice president, Frank Kennedy; honorary secretary, S. L. B. Lines; honorary treasurer, Jos. Showalter; committee, T. F. Dryden, W. R. Ostrom, G. G. Cousins, J. F. S. Madden, A. B. Cooper, E. M. Ashworth, K. A. McIntyre, C. L. Wilson; auditors, H. P. L. Hillman, W. A. Bucke.

This was the last meeting before the summer holidays. The luncheons will be resumed in September.

The Halifax Tramway Company have made representations to the City Council that it will be necessary to raise the fare to seven cents if a satisfactory service is to be maintained and the workmen provided with a fair wage. A committee consisting of Aldermen Regan, Whitman and Murphy was appointed to bring in a report.

Convention Programme of Association of Municipal Electrical Engineers at Niagara Falls

Thursday, June 10

Morning.
  Registration. At The Clifton.
Afternoon. 2.30 o'clock.
  Presidential address.
  Reports.
  Paper. "Sick Benefits and Pension Systems," by M. A. Mackenzie, M.A., Fellow of the British Institute of Actuaries; Professor of Mathematics, University of Toronto.
Evening. 6.00 o'clock.
  Convention dinner, at The Clifton.
  Address. Major W. W. Pope, Secretary, Hydro-electric Power Commission of Ontario.
  (Tickets will be obtained at time of registration, subscription, $2.00.)

Friday, June 11

Morning. 9.30 o'clock.
  Paper. "Merchandise Accounting for Hydro Utilities," by G. J. Mickler, Assistant Auditor, Municipal Accounts, Hydro-electric Power Commission of Ontario.
Afternoon. 2.30 o'clock.
  Paper. "Metering Consumers' Loads," by Paul M. Lincoln, Lincoln Electric Co., Cleveland, O.

Commercial Exhibit

The exhibit of electrical appliances and supplies by the commercial members will be open during both days of the convention, excepting during those periods when the Assosiation is in session. Delegates will find it to their advantage to spend as much time as possible in visiting this exhibit and becoming personally acquainted with the various lines shown.

Canadian Electrical Association will Amend Constitution at Coming Montreal Convention

At the recent convention of the National Electric Light Association held in Pasadena, Cal., some quite drastic changes were made in the constitution. In future, the organization will be so constituted as to include all those who are associated, in any private capacity, with the electrical business, seven classes being provided under which the various firms or individuals will fall. Roughly the classification is as follows:

Class A, central stations and generating companies.

Class B, individuals in these companies.

Class C, professors, consulting engineers, officials of public utilities commissions, etc.

Class D, manufacturing companies.

Class E, individual members of Class D.

Class F, contractors, jobbers, dealers and other companies associated with the industry and not included under other headings.

Class G, individual members in F, and such others as might be desirable, but do not fall under other headings.

The Canadian Electrical Association, which is affiliated with the National Electric Light Association will at the coming Montreal convention also discuss changing its constitution along the same lines. The relationship between the two associations will be somewhat changed, in that the Canadian Association will be looked upon strictly as a Canadian organization, affiliated with a similar organization in the United States. In this way it will maintain its Canadian identity—a feature that will be appreciated by its members, and at the same time should not in any way interfere with its usefulness.

As already announced, the Canadian Electrical Association will hold its annual convention in Montreal at the Ritz-Carlton on June 16, 17, 18. The programme has tentatively been arranged as follows:

Wednesday, 16th—Report of committees.

Thursday, 17th—Special papers by P. M. Lincoln and M. H. Aylesworth, executive manager of the N. E. L. A.

Friday, 18th—Executive sessions, revision of constitution, election of officers, etc.

An enthusiastic entertainment committee is already hard at work and it is certain the Montreal members will maintain their reputation for hospitality. It is suggested by the committee having the registration in charge that registration be made as early as possible and direct to the Ritz-Carlton, Montreal. The Montreal hotels are crowded at the present moment and it is probable these conditions will obtain throughout the month of June.

The secretary is Mr. W. Volkman, 12 Adelaide St. E., Toronto, to whom all correspondence should be directed.

Shawinigan Water and Power Company Extensions

Consequent on an increase demand for power, the Shawinigan Water and Power Company are carrying out extensions to their transmission lines. According to an official announcement, these involve double circuiting the existing transmission line to Quebec; the construction of additional lines between Grand'Mere and Shawinigan Falls, and the building of a double line from Victoriaville to Thetford Mines, completing the double line from Shawinigan Falls to Thetford Mines throughout. Work is being started on a new steel tower line between Shawinigan Falls and Montreal, although the completion of this latter work will not be reached until the fall of 1921.

During the war, the munition plants in the Province of Quebec were large users of power, and when hostilities terminated, the demand of course ceased. But the deficiency has gradually been made up and lately in Montreal, the demand has increased very substantially; to meet this the Montreal Light, Heat, & Power Consolidated have ordered larger amounts of power from the Shawinigan Company. This supply will be in effect during the fall of this year.

The Shawinigan Company is also benefiting from the boom in pulp and paper and in minerals. The pulp and paper companies are extending their plants to meet the ever-increasing demand for their products, and the Shawinigan company has made contracts to supply power—some of this being supplementary to the present needs—to the St. Maurice Paper Co., St. Maurice Lumber Co., The Belgo-Canadian Pulp and Paper Co., and the Brompton Pulp and Paper Co.

Practically all the important asbestos and chrome mining companies in the Danville, Black Lake, Thetford Mines, Robertson and East Broughton districts are now taking their requirements from the Shawinigan Company, and extensions have taken place both in the long-established companies, such as the Asbestos Corporation, and in the more recently developed mines. The load on the Shawinigan company in this district now amounts to about 25,000 h.p. and with the new contracts now entered into, will be increased during 1920 to approximately 35,000 h.p.

Apart from this demand for power in these important industries, the various companies distributing light and power in the municipalities between Quebec and Montreal, have found a rapidly increasing demand in all districts. This is due to a variety of causes, but is largely influenced by the greatly increased use of household appliances, such as electric stoves, vacuum cleaners, washing machines, etc.

The company have completed the surveys of the Gres

Falls property and have made rock borings to determine the location of the rock on which the dam and power plant will ultimately be located.

The power situation as regards the Shawinigan Company is now as follows:—333,700 horse power of electrical and hydraulic development now installed at Shawinigan Falls and at the Laurentide Power Company Limited. There may be added in the future 100,000 horse power at Shawinigan Falls, 60,000 horse power at Laurentide Power Company Limited, and 150,000 horse power at Gres Falls, thus making a total of 643,700 horse power.

The Turn in Business Has Come —Watch Out!

By Mr. H. W. Young*

Public utilities are face to face with a high rate money situation, and financing of new projects or extensions is becoming more difficult. Many of the utilities former resources of "ready cash" have been closed by the abnormal demand for money by commercial enterprises who could offer a high rate of return—and recoup themselves by simply increasing the selling price.

But utilities with their fixed rates cannot ignore costs and must seek new sources to sell securities. As a result witness the selling securities by employees who are disposing of them in small lots, by the partial payment plan, etc., to their friends and customers. And this is a step in the right direction.

The big field, however, has been overlooked by the average utility, and this fact is one of the strangest things to understand. Just why utilities should keep their eyes glued to "far financial pastures" and not see the fertile field at their doors, is one of the peculiar angles in the present financial game. Regardless of present high prices, we must eat. We can wear overalls, and wear out our old clothes but it will be a long time before we can resort to the garbage pile for food.

We need the farmer. We cannot get along without him. He is the primary producer of raw materials. We can get along without the other raw material, but food we must have. The farmer is the boy that sits on the top of the world under any business conditions—he fears the weather only. As a result he builds up a bank balance, steadily and surely. In short the farmer has the money. Eventually his money gets to Wall Street and utilities are forced to pay high rates for this money—if, indeed they can get it at all. Why not raise your money first hand as the farmer does his produces?

Go to the farmer for your money. He will meet you more than half way. You can get it cheap—you have the lever that will open his purse. Give him electric power and light service. He will give you financial aid in building the lines and by investing in your securities.

Another thing, you may not contemplate crossing his farm at present—but keep it in mind, and when you give him service, secure at the same time his option to cross his property at a future time. A little co-operation at the right time will save right of way expense in the future.

There is, however, a plan, an equipment and a vision of the farm line possibilities that utilities can use to advantage. It will help utilities get back to earth again. The world's all right—but the turn in business has come. Protect yourself and line up with the farmer.

---

*President Delta Star Electric Co.

Developing New Employees

By Mr. W. F. McKnight*

The problem of developing new employees in large industrial institutions is a very important one. No one method can be called the correct and only method, as the degree of training and kind of training must be adjusted to suit the requirements of many different industries. There are, however, certain fundamental principles applicable to all and it is proposed to point out in this paper how they may be put into practice.

Demand for Trained Men

That there is a demand for trained men, no one will deny, but before passing on to actual methods of training, it would be well to consider the conditions in which we find ourselves to-day. Canada, after the world war, is passing through what we call a reconstruction period, or getting back to normal times. The process is slow, but we are getting there. For a long time our whole energy and thought were concentrated on the winning of the war. Industry was diverted from its original activities and is now readjusting itself to carry on its peaceful pursuits. Young men were recruited from all branches of industry, from our colleges and schools and have come back ready and willing to start where they left off. The four years spent overseas have been a big sacrifice for these men. They have had their business or college careers upset, and now, due to changed conditions, they cannot continue their schooling or their business, and must start all over again.

Canadian industries are to-day trying to catch up with normal requirements, and our needs seem to have multiplied tenfold. Co-incident with shortages of all kinds of manufactured products is increased prices which continue to soar to unprecedented heights. The only answer to this problem seems to be increased production, and we must turn our thoughts to ways and means of attaining this end.

We have many big industries which have steadily grown from one-man jobs individually owned and operated, to organizations employing thousands of men and millions of capital. The development has been rapid as the advantages of specialization are recognized. The growth of our industries and the study and application of science tend toward the development of higher civic ideals and the betterment of the race. In this process of development, a higher grade of workmanship and executive ability is called for.

Problems of Business Expansion

In expanding from the small to the big industry, many complex problems arise. When the industry was small, one man could handle a variety of jobs. The manager might be the sales manager in the morning and the purchasing agent in the afternoon, and between times might pay some attention to a problem in his shop. In a large institution, while theoretically, the president or manager does all the work, it is delegated to others through a chain of organization. Each department has its own head, and in order to function properly, there must be the fullest co-operation between departments. The success of a business depends entirely on this one thing: co-operation within the organization, and co-operation with whom it serves.

There is much to learn about a big industry, such as the lines of organization, and the responsibility of various departments, the products it manufactures, the methods employed in manufacturing, the raw material it uses and sources of supply, etc. Apart from the material side there is its sales policy, its accounting system and many others which will readily occur to one who has been connected with a large institution.

---

*Educational Director, Northern Electric Company

Training Employees Important

It is hardly possible for one man to learn all about every branch, but every employee should know, or strive to know, the work of his own department and, at the same time, be given some opportunity to learn the functions of other departments. It will be recognized that the problem of training the new employee is an important one, not merely training him for a specific job, but training him in such a way that he will see the opportunities which lie before him, so that as time goes on, he will be able to take on more and more responsibility.

The natural answer to this problem is to start a training programme and the question arises as to what the training will cover and how will it be carried on. In the first place, before starting a training scheme, department heads and sub-heads and all employees in positions of responsibility must recognize the need of training their men, and that there is real value in it. A training programme is of no value unless full co-operation and assistance is offered by all. It should not be forced on an organization.

The kind of training naturally depends upon the need of the industry and the line of work it is engaged in. In analyzing the situation, the logical start would be the particular jobs or positions which the Company has to offer; in other words—a job analysis. This analysis should give in concise form all the information pertaining to a particular job. Such as, name of job; short description of the duties covered by the job; minimum educational qualifications necessary to carry on the job; practical experience which might be necessary and experience with the company which prepares a man for the job. A survey can thus be made of the whole organization which will enable a promotion scheme to be laid out so that employees who are fitting themselves for more responsibility can be promoted when vacancies occur.

Keep Personnel Record for Every Employee

In finding men for promotion, ability must be recognized, and for this purpose a personnel record should be kept for every employee. This record should show his personal and educational qualifications and his record in different departments. A reference to a record of this kind will enable one to locate a man with the experience necessary to fill the job, as shown by the job analysis. This, in a general way, will suggest a line of procedure for the establishment of a training programme.

Consider now the young man entering a large industry. Perhaps the reader has been through this disagreeable experience. He sees numbers of people, all strangers to him and all busy on a variety of tasks which mean nothing to him. He is perplexed and confused and wonders what it is all about. He is probably assigned to some corner of the office, told what his specific duties are, and left to himself. He runs into all kinds of difficulties and does not know where to go for help. What are his impressions, will they be good or bad? First impressions are lasting, and naturally they should be made as pleasant as possible. If he is going to be one of the players in the big industrial game he is entitled to know the rules of the game and his team-mates. It will be good for him and good for the company.

Introduce New Employees to their Position

The problem of introducing a young man to his position has received a great deal of thought and is treated in a variety of ways. To give a man volumes of departmental instructions which are usually the driest of reading matter, will only serve to confuse him. If you wish to make the job look hard this is the correct procedure.

The new man should first become acquainted with the organization and its lines of responsibility. This can be given to him in the form of a manual containing interesting information, as organization charts, views of the plant and description of the equipment, lists of products manufactured and other products handled, etc. This can be followed by a series of interesting papers describing the work of the different departments. Some suggested papers are: "The General Sales Departmnt," "The Functions of a Distributing House," "The Problems of Store Management," etc. Papers of this kind, written in an interesting and instructive manner, will give a new man a working knowledge of the main departments which is essential if he is to understand what the organization is for and what it is trying to accomplish.

Observation Trips

With regard to the manufacturing operations of the company an excellent start can be made by giving a new man an opportunity of observing them first hand. This can be done by observation trips. The man or men should be placed in charge of some one thoroughly acquainted with all the manufacturing details and able to explain them in terms readily understood by the beginner. Observation trips are important. They create interest right away. The information gained is lasting and is more apt to be retained in this way than through any amount of descriptive reading matter.

Observation trips can be extended into periods of actual work in each department. The length of time spent in each department can be proportioned to suit the scope of the work. In this way educational or training courses can be established, the assignments being laid out to suit the line of work the man is ultimately to pursue. This is governed by the man's educational qualifications, his practical experience and his own desires. Some men wish to follow engineering work, others again, have a liking for sales work, and others go in for accounting or merchandising work. In many cases a new man has to be advised and put into the line of work best suited for himself and the company.

Length of Training

The training programme should not be too long. The man is anxious to take up his regular work and from an expense point of view, the investment on educational work should not be out of proportion to length of company service. A salary schedule should be adopted, depending upon the man's educational and personal qualifications and practical experience. A minimum educational qualification should be set as there must be some foundation on which to build his career. During his period of training, his work will be of an unproductive nature. When he learns the work of one department, he is immediately transferred to the next in order. It will be found, however, that the investment is well worth while when measured in ultimate results.

The training of new men and older employees who fit themselves for more responsible positions can be taken care of by an educational department. All phases of this work can thus be centralized and controlled. It opens up a vast new field of activity. Canada can look forward to a period of industrial prosperity and we must prepare men to solve the many perplexing problems which are continually facing us in industry.

The Hazards of Electric Washers

City of Winnipeg.
May 10th, 1920.

Editor, "Electrical News."

Sir:—I would like to draw the attention of manufacturers of electric washing machines to the hazard to life that is being introduced through the placing of snap switches on washing machines. This is a somewhat recent development, but any competent electrical man will, I am sure, agree with me that it is a wrong departure. Not only is the mere presence of a switch, necessarily exposed to dampness in such a location as a washing machine is operated in, likely to be the means of causing shocks to persons, but the manufacturers, in attempting to wire up these switches, have also produced additional danger in that the safety factor of the heavy reinforced cord is affected through the cutting away of the outer covering to admit of the connecting in of a single pole switch; in some cases a splice has been made in the cord, while in others, where a flush type of switch is used, the unbroken conductor is stowed away in a metal box. Another manufacturer brings both sides of the cord to the motor, connecting one wire to one terminal, jumps single wire to the other terminal, but does not connect to same, but, by means of another section of the cord, runs up to the switch and back to the motor. This, of course, covers cases where motors having exposed live terminals are used—another instance of an insufficient appreciation of what is involved.

Inspectors of wiring have for years striven to deal with the brass socket menace in basements and damp places, also in bathrooms, but we have, in the development above outlined, a far more risky condition and one I claim there is no excuse for. While it is true that many a.c. secondary distribution systems are not so protected and, even if this protection were universally provided, I claim that there is no necessity to expose women and children to the danger of even a low voltage shock through the use of a switch on such an appliance.

Yours truly,
F. A. Cambridge.
City Electrician,
City of Winnipeg, Man.

Ottawa Electric Company Changes

Mr. W. H. McIntyre, who was assistant general superintendent and superintendent of the New Business Department of the Ottawa Electric Company, has resigned and accepted an appointment as general manager of the Ottawa Car Manufacturing Company. This is the manufacturing company which builds street cars and wagons of all sorts, carrying on a large repair business and one of the most up-to-date extensive garages in this country.

The New Business Department of the Ottawa Electric Co. has been divided into two branches, known as the Contract Department, which takes in all the inside work in connection with business-getting and advertising for both the Electric and Gas Companies; Mr. H. I. Anscombe, for many years Mr. McIntyre's assistant, has been appointed superintendent of this department. The other division is known as the Soliciting Department and is now under the charge of Mr. J. H. O'Hara as superintendent Mr. O'Hara has been chief solicitor for many years and has been most successful in his work.

Mr. A. A. Dion, general superintendent, will hereafter be known as "General Manager," for both the Electric and Gas Companies. Mr. F. A. Wright will be known as the manager's "Executive."

Personals

Mr. J. F. Daugherty, manager of the St. Thomas Street Railway for the past seven years, and for more than 21 years an employee, has resigned.

Mr. R. Philippe Fortin, of Montreal, has been appointed inspector of gas and electricity, at St. Johns, N. B., for the federal Department of Trade and Commerce.

Mr. R. M. MacMillan has been appointed successor to F. T. Caldwell as division superintendent of telegraphs, central division (Manitoba and Saskatchewan), Grand Trunk Pacific Telegraph Company.

Mr. A. Dwight Smith, former sales manager of the Montreal District of the Northern Electric Company, has been transferred to the Montreal Head Office, and will have charge of train dispatching, fire alarm and marine supply sales.

Mr. N. S. Richards, who, for the past three years, has been sales manager of the Calgary house of the Northern Electric Company, has been transferred to Montreal, and appointed sales manager of the Montreal District, effective June 1st.

Mr. J. M. Robertson, of J. M. Robertson, Limited, consulting engineers, Montreal, has returned from a visit to Winnipeg, where he was in conference with the civic officials in connection with the inquiry into the value of the Winnipeg Electric Railway Company's assets.

Mr. E. Kelly, manager of the British Smelting and Refining Co., Montreal, is now on an extensive business tour and is not expected back for about four months. Mr. W. T. Newman, who was for a number of years with B. and S. H. Thompson Co. Ltd., is at present in charge of the Montreal office.

Mr. Raymond Beaudry, the secretary of the Montreal Tramway Commission, has resigned to resume his duties as secretary of the Dorval Jockey Club. He has been succeeded by Mr. A. Lacasse, who has been private secretary to the Hon. Nap Seguin, minister without portfolio in the Quebec Legislature for the past year.

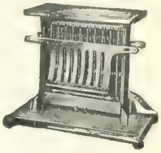
Mr. W. H. McIntyre, formerly assistant general manager of the Ottawa Electric and Gas Companies, was presented recently with a gold watch and chain, and a case of four pipes by the employees of the company on the occasion of his leaving the firm to take up the position of general manager of the Ottawa Car Co., Ottawa, Ont.

Major Roundell Palmer, late of the Royal Engineers, who has been acting as manager of Public Utilities at Brockville, Ont., for the past few weeks, is leaving to become manager of the Hydro-electric Commission at Alexandria. The Ontario Hydro Commission is running a line from Cornwall Station to Alexandria and erecting a small sub-station at the latter point.

Mr. Charles J. Desbaillets, the chief engineer of the City of Sherbrooke, has been appointed engineer in charge of the construction work on the Montreal aqueduct, estimated to cost $4,500,000. He is a graduate in electrical engineering, and for seven years was on the staff of the Canadian Westinghouse Company, part of the period as engineer of the Eastern division. He was prior to that engaged as construction engineer with the Shawinigan Water & Power Company.

A life-size picture of the late John Patterson was unveiled, recently, at the Terminal Station of the Dominion Power & Transmission Co., Hamilton, Ont., by Lieut.-Col. Moodie, president of that company. Mr. Patterson was the originator of the Cataract power project.

ELECTRIC SERVICE
ON THE
FARM



The crying need of the day is greater production of food stuffs. At the same time the lack of life and light —and the drudgery—are constantly driving young men and women away from the farm, where they are needed badly, to the towns and cities which are already over-crowded with non-producers. There is only one solution: give them the advantages of the city without the disadvantages. Give them light and power—electric—to make their work a little lighter and their hours a little shorter — but leave them their freedom and fresh air

Supply of electricity for farm use naturally divides itself into two distinct classes. First, there is the supply available in certain more favored districts where large generating companies have high tension distributing lines in the vicinity and, second, there are the districts lying beyond the range of practical economic reach of the central station lines.

We believe it may be taken for granted that where the first class of power is available, that is where a central station is near enough to supply power and light to the farm, this arrangement will give greater satisfaction to the customer than an isolated plant will do. However, we think it has also been demonstrated that where central station power is not available, the small isolated plant, from ½ to 5 kilowatts capacity, is a substitute which meets the needs of the case in a very satisfactory manner.

The reasons that central station power is preferable to isolated plant are not far to seek. First and foremost, the supply is available, generally, in unlimited quantities and it is not necessary—from the customer's point of view—to consider the amount of his peak load; the capital expenditure, in the vast majority of cases, is less and, finally, the farmer is relieved of the care and operation of the plant.

Conceded then, that central station power is better where available, but that isolated plants are satisfactory where central station power is not available, the whole question seems to resolve itself into an accurate determination of the dividing line within which the isolated plant can operate more economically. This is, in point of fact, the most difficult question to determine in the whole matter.

It will readily be understood that there are many conditions which might effect the radius over which a central station may distribute power—distance from nearest transformer station, density of population along the rural line, the amount of the load taken by each customer, the diversity factor of this load and many other conditions both technical and physical. The Hydro-electric Power Commission of Ontario started out with the theory that they must have three customers to the mile. This, however, has not proven entirely satisfactory and at the present time they are preparing to operate on a basis of group distribution, that is, they do not recommend the installation of electricity unless a number of customers are available in fairly close proximity and then they will only supply power on condition that all in this district become customers. The Toronto & York Radial Railway System have been supplying light and power to farmers and residents on either side of Yonge Street for a number of years and it is the opinion of their chief engineer that farms lying within a mile and a quarter of their electric road can be economically supplied. They adhere to the policy that the operation of an interurban railway can economically be supplemented by the distribution of light and power over the district lying immediately contiguous to the railway line, the argument in favor

Electric Life on the Farm —Mr. W. W. Ballantyne, Stratford, Ont., and his son Norman clipping horses. The little portable motor supplies the power.

of such a combination being that it provides a particularly good load factor, the maximum demand for light not coinciding with the maximum demand for power to operate the railway line.

An example was quoted the other day, for instance, of the cost of installing a transmission line a mile and three-quarters long. This cost was $1,750 and it is evident that the isolated plant proposition would be more economical, unless it can be shown that the depreciation and the upkeep of the isolated plant is very much greater than of the transmission line. However, if two customers would join together and build such a line, costing $875 apiece, it would appear that they have light and power facilities at about the same cost as an isolated plant of a similar capacity. If three, four or five customers could own this line jointly, capital cost would be reduced in proportion. This is merely an indication of the features which must be considered before it is possible to determine whether central station supply or an isolated plant is preferable. It is not our intention to go further into this matter, but rather to point out in a general way what progress has been made, more particularly in the province of Ontario, in the installation and use of both central station power and isolated plant power on a number of our farms.

Electric Life on the Farm —The Monday washing has no terrors for Mrs. Ballantyne. They start it up and then go off and attend to their house work. A simple snap of the switch saves hours of hard labor.

What the Ontario Hydro Commission is Doing to Supply Light and Power to the Farmer

When the Ontario Hydro Commission started out some years ago to supply light and power to farmers in Southwestern Ontario, there were comparatively few precedents —especially on this continent. Very considerable progress was made, however, in the more favored districts, that is districts lying near low tension transmission lines. Not only have the farm houses and barns been supplied with light and power, but syndicates have been formed among neighboring farmers to use high power equipment for such operations as corn cutting, grain chopping, threshing, and so on. For the latter operation special equipment was devised—portable, of course. This equipment was carried on two light wagons, covered with a wooden housing to protect the machines from the sun and rain. One of these wagons carried the transformers, (power is taken directly from the 2,200 volt line), the necessary switch gear and the cable The other wagon carried the motor with its control apparatus. The use to which light power was put in the barn included milking, grain chopping, root chopping, cream separating, running fanning mill, grind stone, emery wheel, and so on. In the home, all the usual appliances were made available.

The main obstacle to the supply of electric power on the farm must always remain its cost and the Commission has found that the cost is too great to appeal to the average farmer, unless he happens to be favorably situated. For example, the original basis of operation was three customers to a mile, but this is only true where the distribution lines may reach out comparatively short distances from a central point. As a consequence, the Commission has revised its plans somewhat and will, in future, operate on what may be called the group basis. For example, up to the present time a township may have made a request for a supply of power which the Commission has endeavored to supply; the farmers may be very much scattered over this whole township and a comparatively few may be taking power, thus making the cost to the others very high. By the new arrangement, the Commission will protect the farmer from this ultimate high rate, to a certain extent, in that they will consider only the supply of power to a district which is thickly enough populated to justify a fair price, if all the people within that area assume their part of the obli-

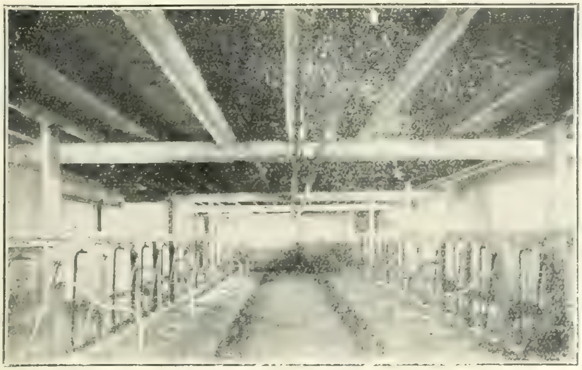
Electric Life on the Farm —Mrs. Norman Ballantyne no longer uses the old back-breaking broom—Cleaning is now a pleasure.

Electric Life on the Farm—Mrs. Ballantyne, Sr., enjoys ironing out on the cool porch. If she prefers it she can do it just as well sitting down for she has no running 'to and fro' to change irons.

gation. This section may all be included within one township or it may take in parts of two, three or four townships. In this way the farmers who are advantageously grouped will be able to buy power on an economic basis, while others, less fortunately situated, will have to wait for sometime or resort to the alternative of an isolated plant. To use the Commission's own words, "It has been considered advisable that districts should be formed in which the same rates shall apply to all customers. These districts shall be areas that can be served by the construction of lines from one power distributing centre. Each district will have a radius of from eight to twelve miles and shall include all townships or parts of townships."

The charges made by the Commission are, first, a primary charge depending on the cost per mile of installation, number of customers on the line, and so on, and a secondary or consumption charge which will be metered. The base rate per kw.h. will be for the first 14 hours use per month of the class demand and all additional consumption per month will be one-half the base rate. The different classes of service are shown below in Table 1 and the average monthly consumption based on the average figures obtained from

Electric Life on the Farm—This is the electric plant as it looks in the basement of J. A. Marshall's barn, near Aurora, Ont. The engine stands on a truck and is readily portable for other uses. A half hour a day is all the engine works to keep the batteries charged.



Electric Life on the Farm—Interior view of electrically lighted cattle stables of Mr. Noel Reynolds, St. Agnes, Quebec.

districts already in operation are shown in Table 2. These classes are more fully described as follows:

Table 1

The following are the classes under which power would be supplied in rural districts.

Class	Service	Class Demand Kilowatts	Phase	Volts
1	Hamlet lighting	0.75	1	110
2	House lighting	1	1	110
3	Farm lighting	2	1	110
4	Lighting and cooking	5	1	220/110
5	Light farm service	5	1&3	220/110
6	Medium farm service	9	1&3	220/110
7	Heavy farm service	15	1&3	220/110
8	Syndicate outfits	.	3	4000/2200

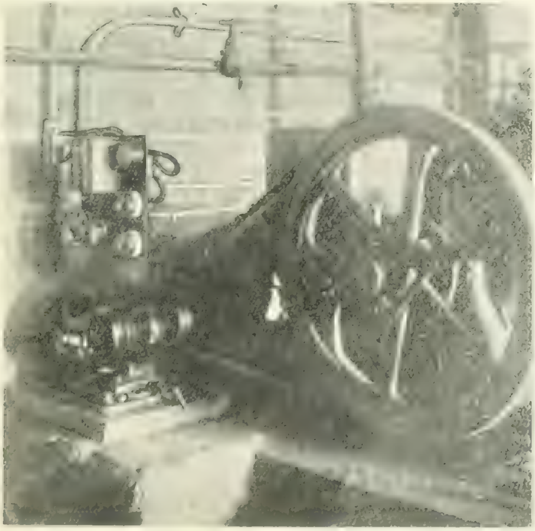
Table 2

Average figures obtained from districts now in operation

Class	Average use per Mo. in K. W. H.	Amount at 1st rate	Amount at 2nd rate
1	15	10	5
2	15	14	1
3	40	28	12
4	150	70	80
5	75	70	5
6	150	126	24
7	300	210	90

Note.—If an electric range is used in classes 6 and 7, the consumption would be increased by 150 K.W.H., all of which would be charged at the 2nd rate.

Class 1—Hamlet Lighting—will include four or five consumers fed off one transformer for house lighting only. It does not include farmers or power customers.



Electric Life on the Farm—This is Mr. John Lawson's plant, just out from Aurora. Both engine and generator are on a solid concrete foundation which will prolong their natural life. The engine also operates a shaft for other power work.

This is the home of Mr. W. W. Ballantyne, Stratford.—House and buildings all Electric-lighted.

Class 2—House Lighting—includes residences that cannot be grouped in hamlets, but does not include farmers or power customers.

Class 3—Farm Lighting—includes lighting and the operation of miscellaneous small equipment of the house and out-buildings on a farm.

Class 4—Lighting and Cooking—is the same as class 3 with the addition of an electric range.

Class 5—Light Farm Service—is the same as class 3 with the addition of a 5 h.p. motor.

Class 6—Medium Farm Service—is the same as class 3, with the addition of a 5 h.p. motor and an electric range, or a 10 h.p. motor without the electric range.

Class 7—Heavy Farm Service—is the same as class 3 with the addition of a 10 to 20 h.p. motor and an electric range.

Class 8—Syndicate Outfits—any of the foregoing classes may join together as a syndicate to operate a large outfit, so long as their combined class demands are equal to the kilowatt capacity of the syndicate motor.

The Commission recently quoted the following rates as an example:

"On the basis of power costing $35.00 per year at the transformer station, and on the basis of 13 kilowatts per mile of power supplied, the average cost per year for the various classes would be as follows:

1. Service charge, $32; consumption charge, $12; total, $44

2. Service charge, $36, consumption charge, $14; total $50

3. Service charge, $62; consumption charge, $33; total, $95.

4. Service charge, $120; consumption charge, $106; total, $226.

5. Service charge, $140; consumption charge, $70; total, $210.

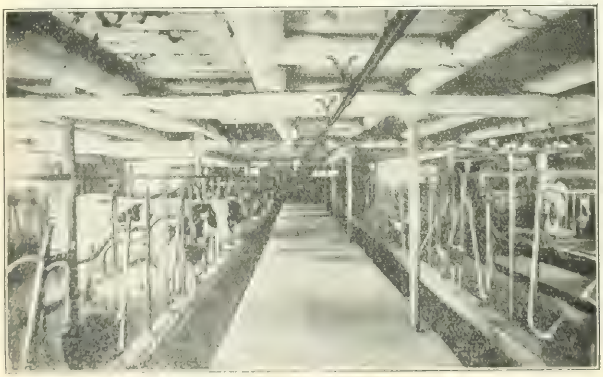
6. Service charge, $222, consumption charge, $133; total, $355.

7. Service charge, $321; consumption charge, $245; total, $566."

Toronto & York Radial Railway

The Toronto & York Radial System, of which Mr. W. B. Boyd is chief engineer, has a railway line running from Toronto to Newmarket and thence east to Jackson's Point, a distance of about 55 miles. A 12,000 volt transmission line, fed from the terminal station in Toronto, provides sub-stations at York Mills, Bond Lake, Newmarket and Keswick, spaced 10 to 15 miles apart. These sub-stations, in addition to motor-generator sets to feed the trolley wires at

A "City" bathroom made possible by running water.

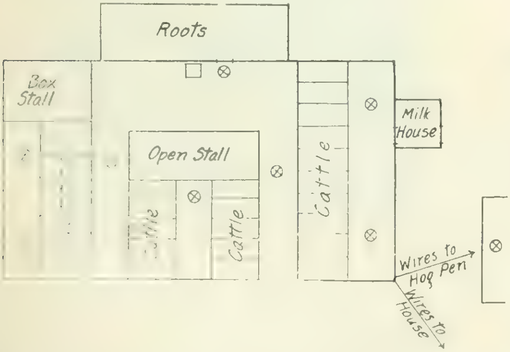


Electric Life on the Farm —Electric lights, drinking bowls, litter carrier, etc., make Mr. McPhee's cow barn, Vankleek Hill, Ont., up-to-date and work easier.

The electric home of Mr. and Mrs. Marshall, Aurora, Ont. They do not "hanker" for city life.

550 volts, also contain 12,000/4100 volt transformers for lighting and small power service, distribution being 3 phase 4 wire, so that between any phase and neutral the voltage is 2300. Mr. Boyd states that he considers 10 miles as an economic limit of the 4100 volt line for the average rural district, which means that with 15 miles between sub-stations, these low voltage lines cover the entire distance between, and, say, two to three miles either to right or left. Beyond that distance the loss in power or the necessary increase in copper to overcome that loss makes the cost of supplying the farmer prohibitive.

This company finds that under these conditions the rural load is a satisfactory one in that it tends to fill the valleys of the railway load. An example of this is the operation of a combined chopping and flour mill. The owner of the mill runs the chopping department during the day when various individuals have to be served and does all his flour manufacturing during the night, leaving one man in operation. In this way his load curve is almost a straight line during six days of the week. The company's experience also is that the lighting in the farm house does not overlap with the peak on the railway system, which is greatest during the [illegible] hours when the farmer does not require a service. As a matter of fact, the cost of lighting, whether the supply comes from the central station or an isolated plant, will rarely be low enough to induce a farmer to be prodigal in the use of electric current for lighting earlier in the evening than is absolutely necessary.



Electric Life on the Farm—Rough sketch plan of out-buildings of Mr. J. A. Marshall, Aurora, showing location of lights. Both Mr. and Mrs. Marshall say their electric plant has taken a lot of the drudgery out of their lives.

The Toronto & York Radial, in the matter of rates, makes a service charge as well as a meter charge. There is, also, a minimum monthly payment and, except under special conditions, a minimum yearly payment. Table 3 gives an average idea of the cost of residence lighting. The service charge is based on the number of rooms in the house. The yearly minimum is twelve times the monthly minimum quoted in this table.

Table 3
Residential Lighting

No. Rooms	Service for	Rate for	Min. Monthly
6	First 15 Kw.h	Balance	$ .90
7 & 8	" 20 "	"	1.20
9 & 10	" 25 "	"	1.50
11 & 12	" 30 "	"	1.80
13 & 14	" 40 "	"	2.40
15 to 17	" 50 "	"	3.00
18 to 20	" 60 "	"	3.60
21 to 24	" 70 "	"	4.20

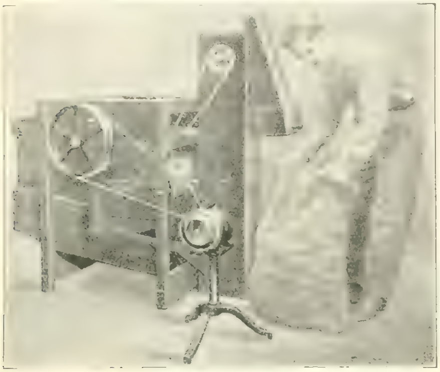
10 per cent. discount prompt payment

Where Central Station Service is Not Available the Next Best Thing is an Isolated Plant

It will be many many years before the central stations will be in a position to take care of the demand for light and power that is likely to develop in rural districts lying within reasonably close proximity to their lines. Even if that were accomplished at the present time, there are vast areas which the central station can never cover and which, therefore, remain the legitimate field of the isolated plant. It has been said that the wide distribution of hydro-electric power in southwestern Ontario has made it difficult for the isolated plant to get a foothold and this may seem a reasonable statement at first thought. On the other hand, it is argued that the matter of selling an isolated plant to a farmer is wholly the result of education—spade work, so to speak—and, just as farmers a few miles off our provincial highways are clamoring for roads as good as their neighbors', so it is reasonable that farmers a few miles beyond the area of distribution of the central station company will see the advantages enjoyed by their more fortunate neighbors and will clamor for advantages of the same kind. Arguing in this way, it would almost seem as if the district that has been already supplied to the limit by a central station automatically becomes the best field for the isolated plant salesman and one likely to yield the quickest results.

Be that as it may, in the province of Ontario, where the use of electric power is probably much more general than in other provinces in the Dominion, isolated plants by the hundreds are in operation and frequently, though of course not in every case, they are in close proximity to the lines of the Hydro, or of the private companies. An example of this latter is to be found in a number of plants installed within five miles of Yonge Street and almost within reach of the private companies' lines. The whole question seems to resolve itself into selling the idea of electricity to the [illegible] [illegible] and what electricity means to them in labor saving devices both in the house and the out buildings, as well as good lighting and a plentiful supply of water at the tap.

The farmer today needs electricity even more than the city man. The greatest drawback to farm life is the long hours of hard labor for both men and women, which makes it practically impossible to keep "help" either inside or outdoors and, perhaps, what is still more important, to keep the boys and girls from flocking to the cities. If electricity saves labor, time and money for the farmer and enables the men and women to do a day's work in what a city man would consider a day's time, then electricity will have performed an invaluable service.



Electric Life on the Farm—Mr. Ballantyne operates his fanning mill with his little portable motor

Of course, the greatest advantage is light—plenty of light—and just where you want it. The salesman of an electric plant must often have been convinced in his arguments with the farmer that the trouble lies in the fact that he has really never realized what good lighting means. Hence, the necessity for demonstration. This is the reason the salesman who runs a little plant in his Ford truck out to the farmer, installs two or three lamps and flashes a light on so that comparison may be made with the dingy effect of the kerosene lamps, is so successful in making sales. And this system of demonstration must be carried out throughout the other operations.

It is a foregone conclusion, therefore, that the type of man who can sell an electric plant to the farmer to operate his pulp grinder, drive his fanning mill, or his grindstone or operate his milk separator, must be a man who has had practical experience in the operation of those things by hand, himself—he must know both the farmer and his habits and work. If any general criticism can be made of the methods that have been used in selling isolated plants, or indeed electricity in any form, to farmers, it probably is that the man who has been sent out as salesman knew too much about electricity and too little about farming. However, we have just been pioneering so far, gathering information and experience with which to commence the real battle.

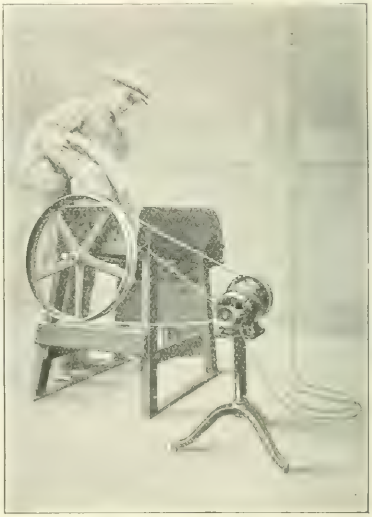
The Experience of W. W. Ballantyne, Stratford, Ont.

Much has been said and written about what the isolated plant can do on the farm, but, after all, the testimony of the farmer who has used one of these plants is the most convincing evidence. As typical examples, we illustrate herewith three farms that have used isolated plants for some time—Mr. Ballantyne, of Stratford, and Mr. Marshall and Mr. Lawson on farms separated perhaps three or four miles, and each about the same distance from Yonge Street, near Aurora.

Mr. W. W. Ballantyne has a Delco plant and, under recent date, this is what he said about it:

"The plant you sold me to light my farm has not only given us the pleasure and convenience of electric light in all our buildings, but is rapidly paying for itself in the work it does.

"It would be a good investment for us aside from the lighting altogether. So far, we have found 16 jobs for the plant on our farm and we are constantly finding new jobs for it. We are using the power to run—



Electric Life on the Farm—Chopping the cattle food electrically

(1) 3-unit milking machine.
(2) Cream separators.
(3) The pump in the dairy.
(4) Root pulper.
(5) Emery stone.
(6) Horse clippers.
(7) Sheep shearing machine.
(8) Fanning mill.
(9) Washing machine.
(10) Vacuum cleaner.
(11) Electric iron.
(12) Toaster.
(13) Charging batteries on our motor car.
(14) Pumping water for household use.
(15) Lighting our home, stable, outbuildings, and yard.
(16) Violet Ray apparatus.

"We have never figured this work down to so many hours per day, but we know that we can operate the farm with one less man than we used to. Figure out the wages

Panoramic view of Mr. John Lawson's buildings, Aurora, Ont. Every corner is electric lighted

and board of a farm hand and you can see what the plant saves us.

"We used to run a gas engine on the milker and cream separator, at a cost of 10 cents a day. Our plant supplying light and power for the whole farm costs only 7 cents a day.

"It would not only be a harder proposition to run our farm without this plant, but it would cost us a lot more money."

The picture of Mr. Ballantyne's farm is shown in this article, as also are a number of reproductions of electrical operations being carried on in his home and at the barn. The plant used is a three-quarter kilowatt and it is interesting to note, in view of the servant and hired man problem on the farm, that one of the chief claims made for this plant is the saving it effects in hours. The company state that they have made an investigation covering sworn statements from a large number of users and that they believe the following savings are substantially correct:

Cleaning and trimming lamps	3 hours
Operating the separator	1 hour
Running the washing machine	3 hours
Running grindstone	½ hour
Electric iron	1 hour
Pumping water	5 hours
Operating fanning mill	½ hour

This means a total saving of 14 hours per week, which, on the basis of a 10-hour day, is practically a day and a half saved for a man or woman. It will be noticed, too, that this includes only a part of the operations that are frequently carried out on the farm with electric power, such as the operating of the pulping mill, the vacuum cleaner and so on, so that the saving might easily be more than this amount. Nor must it be forgotten that both in the barn and the house, work can be done not only more efficiently, but also more quickly with a good light than with the dim light of the kerosene lantern or lamp.

Mr. Ballantyne says he has never figured out what the actual cost of operation of the plant is, but the company states that an average taken of the cost figures of dozens of farmers who are using their plants places the figure anywhere from $12 to $20 per year. This, of course, refers to the cost of the fuel and oil used in operating the plant. To this must be added the depreciation, though, in general, it may be said that the life of such a plant should be many many years, with the single exception of the two items, batteries and lamps.

Mr. J. A. Marshall was One of the First to Instal an Electric Plant

It is said that the average farmer, when approached regarding the installation of an isolated plant, replies that it is all very well for the man who farms in a big way, with several hundred acres, very large buildings, valuable thoroughbred stock, and so on, but that he is just the average farmer on a hundred acres.

Well, Mr. J. A. Marshall is just one of the average farmers who operates about one hundred acres, with the average amount of stock. The only difference is that he is a little more progressive and has caught the idea of getting rid, both for himself and for Mrs. Marshall, of as much as possible of that drudgery, which, in the past, has been too characteristic of farm life. In consequence, his home at night is lighted up like a city home and his outbuildings are so illuminated that he can do whatever work has to be done during the hours of darkness both efficiently and quickly.

Like all farmers, Mr. and Mrs. Marshall are hospitable, but, at the same time they give you the impression that they are able to extend this hospitality without having to inconvenience themselves or tire themselves out unduly. As Mrs. Marshall herself says, electricity lightens her work and allows her now to have periods of leisure, where formerly this was impossible.

Under the electric reading lamp

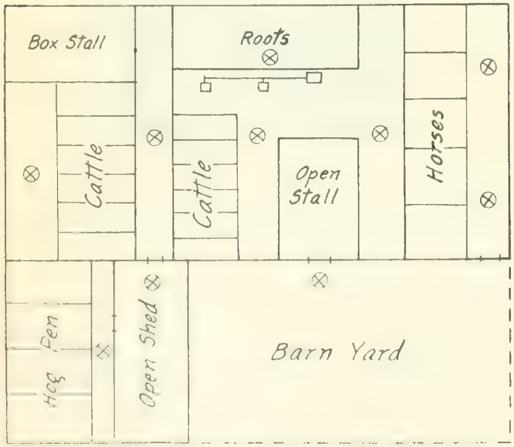
The Marshall plant lights about 22 lamps, operates the washing machine, the cream separator, the pulper and the fanning mill. This plant was supplied by the Northern Electric Company and consists of a portable engine which Mr. Marshall also uses for other purposes than driving his generator. The motor, installed on a portable stand, also performs different operations. A rough sketch of Mr. Marshall's barn is shown. It will be seen that ample lights are provided in the basement, where, of course, most of the night work is done—tending the cattle and horses during the winter on early mornings and late at night. Mr. Marshall also has lights upstairs in the barn, three of them, and last fall, during threshing time, when the short days closed in before the [illegible] was [illegible]

[illegible] and the work proceeded for a couple of hours, making it possible for them to complete the job that day and move to the next farm, instead of having to keep them another night for just two hours' work. Mr. Marshall also finds these lamps of great convenience during the late harvest when conditions force him to work, occasionally, late into the night. His straw and hay, of course, are stored in the barn and these supplies can be obtained readily as desired. Mr. Marshall also has a light in his granary, so that, if necessary, he can work there after dark, operating his fanning mill with a little portable motor. Mrs. Marshall has her house lighted in a most modern and attractive way, and also uses the washing machine regularly. The vacuum cleaner is going to be her next indulgence and a churn that can be operated by the motor. Mrs. Marshall also has used an electric iron, but, as she says, there is a fire on most of the time and she would just as soon iron the old way. During the hot summer months, she may change her mind in this respect.

Mr. Marshall's plant is 650 watt capacity and he states that as nearly as he can figure out, it costs him $1.50 a month for fuel. The plant has operated without any further expense or without giving him any trouble since last summer.

Another 'Average' Farmer Finds It to His Advantage to Have Electric Light and Power

A panoramic view of Mr. Lawson's farm buildings is shown herewith, also a rough sketch plan of his barn and a photograph of his plant. Mr. Lawson is a typical farmer with a hundred-acre lot. His fields are well worked; his cattle are thrifty and everything about the farm speaks prosperity and contentment. Mrs. Lawson, too, has time [illegible] literally, takes a delight in showing her friends around her beautifully lighted home.



Electric Life on the Farm—Rough sketch plan of out-buildings of Mr. Lawson, Aurora

Mr. Lawson's outbuildings are splendidly lighted, even to the garage and wood house, switches being well arranged so that the dark places may be well lighted in advance. Mr. Lawson drives his electric generator with a 4 h.p. engine which he also uses for a number of other purposes. The total consumption of fuel he figures at 10 gallons per month, of which, probably, one-half is used for electric light and power. Mr. Lawson is very skillful in improvising mechanical devices for saving labor. For example, his gasoline engine drives the shaft from which are operated a number of devices, such as the root pulper and the separator. He has also, himself, fitted up an arrangement for operating the hand-driven washing machine with the portable motor. He is planning to do the same with the churn and the fanning mill. As with Mr. Marshall, the Lawson farm is an outstanding feature every night in the neighborhood on account of the bright lights and the added life and enjoyment they bring.

Electric Life on the Farm—Mrs Lawson says a vacuum cleaner is the "next"

The plants on both the Marshall and Lawson farms were supplied by the Northern Electric Company and installed by the Matson Electric Company of Aurora. Mr. Matson is the right type of man for this work as he has the faculty of gaining the confidence of the farm folks: They like him and he likes them and that is a big step always towards doing business. We can look forward confidently to seeing many more plants in the Aurora district, and the farmers can depend upon Mr. Matson to give them the service they require.

Running Water in the Home

There are two very special features in connection with the use of electricity on the farm, the value of which is frequently overlooked. The first of these is the water distribution system which it is possible to operate. The electric motor can easily be adjusted to operate a small pump which will keep a tank, situated either at the top of the house or in the barn, full with water, which can be distributed by gravity to any part of the house or barn. A tap in the kitchen saves many hundreds of steps in a year and in these days when the housewife is frequently forced to take all those steps herself, not having any help in the home, if 15 or 20 per cent. of these steps could be saved, it means all the difference between an enjoyable evening and an evening in which one is too much overwrought to enjoy life.

Just as with the electric light itself, use of running water is not appreciated at its real worth, because its value is not known. A few years ago few farmers cared whether they had a telephone in their homes or not, yet who ever heard of a farmer who once installed a telephone ever letting it go out of his house. The same is just as true of the electric light plant and with it the water distribution system. No farmer need fear that his investment will not pay dividends and no salesman need hesitate to use all possible pressure to get the farmer to buy this equipment. such an investment is as good as a Dominion Victory Bond, and just as certain to pay dividends.

Poultry Raising

In the old days, every farmer kept a few hens chiefly for his own convenience, but, if he happened to have more than he required, sold them for whatever he could get. Prices used to run from 15c to 20c per dozen for eggs, and the farmer got the impression, rightly enough, that the average flock of hens practically ate their heads off. Today, all this is changed. The price of all competing foods has risen so high that eggs have had to follow suit and those who were lucky enough during the past two or three winters to have eggs to sell during the months of December, January and February, know that in the larger cities of Canada they found a ready market at 10c apiece, $1.20 a dozen, and more.

This is the Armstrong incubator. All it needs is electric light

The two essentials for winter laying, in the main, seem to be—a chick hatched not later than the beginning of April and a uniformly longer working day during the winter months, which latter is obtainable through the use of electric light.

To produce April chicks, it is essential that the eggs be hatched by incubators scientifically equipped, and many nice little savings accounts have been started as a result.

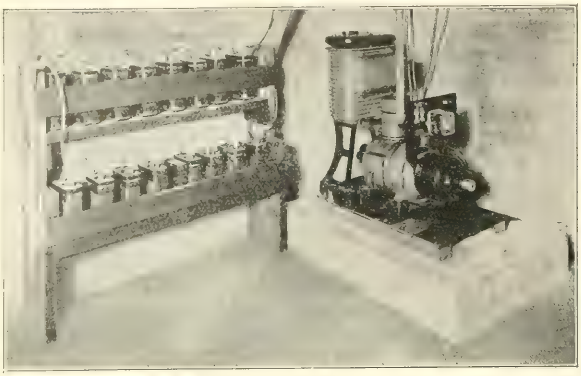
This has been possible chiefly through the use of electric light. It seems difficult to believe, but figures recently published show that it is not only possible to produce much greater quantities of eggs than formerly, but that it is possible to produce them at the season of the year when the prices are highest. A properly-constructed and electrically operated incubator has recently been placed on the market. The cost of operation is a minimum—a matter of cents—the strong feature of this equipment being that one becomes independent of the whims of mother hen and is able to hatch chicks at any time and to keep them in a thrifty, healthy, safe conditions in the brooder in all weathers. We illustrate the incubator herewith, known as the Armstrong. This one differs from others in that it is scientifically designed to supply the correct amount of moisture and ventilation. The brooder or hover is equally well designed. It is manufactured by G. F. Armstrong, 214 Aberdeen Ave., Hamilton, and distributed by the Northern Electric Company.

But it is one thing to raise chicks and another thing to get them to lay eggs. The idea of re-arranging the ordinary hen's daily schedule has been much "pooh-poohed." In the past it appeared to suit her convenience to begin to lay about the first or middle of March, and it followed that, as all hens were more or less of the same kind, during the months of December, January and February no fresh eggs were available, whereas during the months of April, May and June, there was a big surplus. That this has actually been overcome is evidenced by many scientific experiments, the results of which have been published. In our issue of December 1, 1919, we reproduced figures which were the result of experiments by Professor Herner, of the Department of Poultry Husbandry, Manitoba Agricultural College at Winnipeg. Professor Herner experimented with 12 groups of 25 each, single comb White Leghorn pullets, the same age and as uniform as possible in size and condition. Six of these pens were given artificial electric light and the other six no artificial light—between the dates November 15, 1918, and April 15, 1919. In the six pens where the artificial illumination was used, lights were turned on with the approach of dusk and the pens were kept lighted until 10.30 p.m. In the morning the lights were turned on at 7.00 a.m.

The figures of cost, as worked out by Professor Herner, show that for the artificially-illuminated groups the cost of production of a dozen of eggs, including the light used, was 21.1c against 33.6c per dozen for the unlighted groups.

It will thus be seen that the production of eggs might be made a very profitable undertaking on the farm. The chief labor comes during the winter, at a time when the farmer has most leisure. Another advantage of this kind of production is that it yields immediate financial returns, always a convenience, but more particularly so on a farm, where financial results only come, in general, after two or three years of preparation.

Week ending		150 Pullets under Artificial Lighting Conditions	150 Pullets under Ordinary Daylight Conditions
October	27	220 eggs	224 eggs
November	3	224 "	198 "
"	10	210 "	202 "
"	17	373 "	249 "
"	24	497 "	233 "
December	1	553 "	269 "
"	8	569 "	273 "
"	15	571 "	344 "
"	22	496 "	318 "
"	29	245 "	142 "
January	5	133 "	59 "
"	12	397 "	200 "
"	19	558 "	361 "
"	26	519 "	300 "
February	2	441 "	213 "
"	9	287 "	161 "
"	16	257 "	186 "
"	23	277 "	175 "
March	2	204 "	166 "
"	9	273 "	312 "
"	16	436 "	501 "
"	23	387 "	434 "
"	30	419 "	516 "
April	6	480 "	574 "
"	13	490 "	544 "
"	20	443 "	500 "
"	27	434 "	511 "
May	4	468 "	581 "
"	11	466 "	578 "
"	18	500 "	595 "
"	25	462 "	473 "
June	1	270 "	277 "
"	8	299 "	310 "
"	15	412 "	363 "
"	22	274 "	319 "



Electric Life in the Country—Installation in Mr. C. S. Corson's house, Rosebank, Ont. This is a Northern Electric plant.

What Plants Are Available in Canada

While there are a large number of farm plants manufactured in the United States, comparatively few of these firms have found it profitable to enter the Canadian field. However, the last year or two has given evidence that manufacturers are beginning to think differently. For many years the only plant available in Canada was that supplied by R. A. Lister and Company, whose works are located at Dursley, England. These plants are well known in different parts of Canada and, thanks to their efficient operation, many summer homes and isolated residences enjoy the luxuries of lighting and power which would be otherwise impossible. One of their plants is installed in the "Connaught" laboratories, and many of the large farms and ranches in Western Canada are using their 4.8 kilowatt set. The automatic features on their larger capacity machines has proven very satisfactory, demanding a minimum of attention—practically nothing except to see that gasoline and oil are supplied at proper intervals.

Next in the field, perhaps, was the Delco. This plant is manufactured in Dayton, Ohio, and is a self contained plant, the most popular size having a capacity of about a kilowatt. The unit is very compact, occupying a minimum of space, as the engine and generator are mounted on the same stand and direct connected. It will be remembered that this is the type of plant installed by Mr. Ballantyne, at Stratford.

Within the last two or three years the Northern Electric Company have also been strong competitors in the field of farm lighting and power plants. Two of the plants described in previous pages were supplied by this company and a vast amount of literature has been prepared and distributed in an endeavor to educate the farmer to the value of electric service. This company handle various sizes from ¾ kilowatt up, the smaller ones being belt driven from the engine. The Northern Electric Company have a large number of agencies distributed over the country, and during the past year have installed a number of plants which are giving a most satisfactory service. The two plants described in the earlier pages of this article, installed on the farms of Mr. Lawson and Mr. Marshall, near Aurora, are typical of a large number of others, though many of the plants installed are larger than those described.

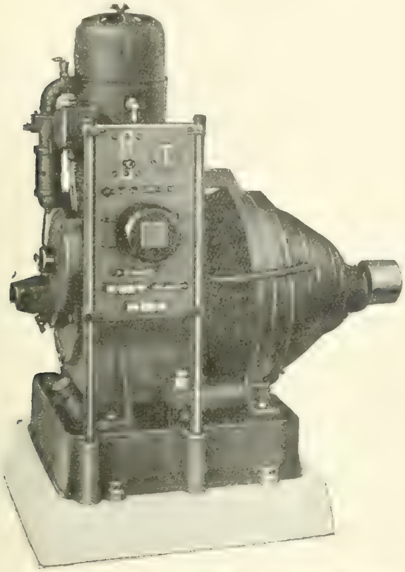
The Northern Electric Company find that the province of Quebec has taken hold of the isolated plant idea, and a number of the progressive farmers in that province now enjoy the luxury of city light and power. The same is true also of the western provinces, where Northern Electric products in general are well known.

The Canadian Fairbanks-Morse Company sell a belt connected gasoline-electric unit and have installed these in

Electric Life on the Farm—One engine is used to drive the electric plant and milking machine on Mr. Fraser's farm, Dundee, Que. Another type of Northern Electric plant.

villages and small towns, as well as at isolated points for farmers and rural residents. They sell a 40, a 65, a 100, and a 200 light.

The Canadian General Electric Company have also decided to place a plant on the market and an illustration of their plant is shown in this article. It will be known as the "Home" light and power unit, and will have a capacity of a kilowatt and a half, and will deliver current at 32 volts. The engine is a vertical, air-cooled, 4 cycle type, with a governor that automatically retains a uniform speed of approximately 1000 revolutions per minute. A 4 inch diameter belt with a 3 in. face is mounted on the engine shaft so that machinery requiring 2 h.p. or less can be driven direct from the engine. Either gasoline or kerosene may be used. The Canadian General Electric Company have prepared a very complete booklet which tells all about this plant; how to install it and keep it in good running order.



This plant is sold by the Canadian General Electric Co

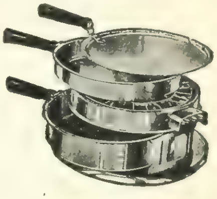
Special instructions have also been issued with regard to the care of the storage batteries.

Another plant suitable for farm needs is the "Uni-Lectric," which is being sold by the Masco Company, Toronto. This is a 110 volt. plant, operating without batteries. It has a capacity of 1000 watts and is made either with or without a self-starter.

A Word to Contractor-Dealers

A supply of electric service to the farmer is a certain demand of the near future and the question arises—who will supply it? Naturally we believe this is a service that can be best supplied by the contractor because it most nearly coincides with his regular work. It is evident, at least, that an electrical contractor must instal the plant and the wiring in both the out-buildings and the house. Is he going to leave the selling end—the profitable end—to the implement agent or some other similar type, a man who has no interest whatever in electrical matters beyond the immediate profits in dollars and cents ?

No need to "start the fire" An electric grill in the hands of the efficient farmer housewife will prepare a light lunch in quarter the time



Contractor-dealers are urged to study carefully the possibilities in installing farm plants. This business promises to yield plentifully both in profit and satisfaction. And in making this study do not forget that the farmer, whatever he may have been in the past, financially, is a man of means today.

Electric Life on the Farm—Mr. Fraser's cow barn, Dundee, Que., showing the electric lights.

Electrical Appliances—

What the Women Themselves Say About Them

By Housewife

A few days ago a number of ladies, over their afternoon tea, began a discussion on household efficiency. One lady particularly recommended electrical appliances, and for the remainder of their time together these devices were the subject of conversation, especially the percolator, toaster and iron. There was no question in the mind of those who had used such appliances as to their economy in every way. There were other advantages cited, in the way of having everything concerned—even one's temper—absolutely at its best. The discussion, however, chiefly concerned the question of economy. With the toaster, those who had used it claimed an actual saving in time of at least five minutes every time the toaster was used, and as much more time in proportion as there were members in the family. The facts elicited were as follows: When once the toaster is heated—as it should be before bread is placed upon it——one can begin with the cereal and toast bread quite rapidly enough for a good-sized family in the meantime. There is a saving of butter as well, for every housewife knows it is economy to butter toast while it is hot. It takes less butter to make the toast palatable since it sinks in and softens the crust more rapidly. Moreover there are seldom any pieces extra and if there are, while such pieces can be used for soup or in puddings, to have them buttered is quite unnecessary and an extravagance few housewives would indulge in. One lady who, by the way did not own a toaster, suggested that since the toast was really so much better hot and freshly buttered would not the whole plan of economy be defeated in the end by the family eating much more toast. There was general laughter at this and a rapid fire of comment which ended in a demand for a vote to get the concensus of opinion on the question. A few of the ladies were distinctly surprised when the decision was almost unanimously, No! Then one lady ventured to explain, as far as she could from her own experience, what she believed to be the reason for this. She had noticed the saving of bread, as well as butter, and had been unable to account for what seemed so paradoxical, since the toast was unquestionably so much better. Finally she had mentioned the matter to a friend who was a dietician, and had received the possible solution that the toast being hot and therefore more palatable was more rapidly digested and assimilated, hence the appetite appeased more quickly. The same explanation, she said, held good for the comparative values between all hot and cold cereals. These were highly technical points, but they strongly appealed to up-to-date housewives.

The matter of time and effort saved was summed up by the statement that the toaster used once a day for a year would actually save, at 5 minutes per day, 25½ hours per year, to say nothing of the time saved in running to and from the kitchen between courses. In one actual case mentioned where the dining table was 30 ft. from the stove, 4½ miles per year would be saved. Supposing one were married 40 years the time saved would be 1 year, 52½ days, and the distance 165 miles. Everyone present could imagine far more interesting ways of spending a year as well as a far more exciting and enjoyable 165 mile excursion. The toaster was accorded an honorable place among efficiency devices.

The percolator next came under discussion, and the following points were claimed for it without dissent: Good coffee, without watching; coffee made in the old way demanded constant attention lest it boil over; no soaking of coffee grounds and consequent loss of flavour; the electric percolator takes care of itself even to the automatic switch which, should the coffee boil away, is disconnected and the current turned off. The ordinary percolator must have the flame carefully adjusted to suit it, and must of necessity occupy one whole gas ring because the heat should be central. Other points were: That the time taken to make coffee with the electric percolator was only seven minutes, and the cost for current less than 2 cents per hour. Compared with this, experience proved that it takes double that time to boil the same quantity of water on a gas ring with the gas full on. One of the greatest advantages of all is the certainty of having hot coffee throughout the breakfast.

When the electric iron was mentioned no one was found to defend the old method of ironing. Besides the advantages of a well-balanced, always clean and evenly-heated iron, the fact of a cool laundry was mentioned with enthusiasm. One enthusiast declared that in ironing for two, one hour per week was saved. With the old method the number of steps taken to change irons, say every 6 minutes, when only 2 steps were required each way, meant 100 steps during the 2½ hours necessary for the average ironing. With the electric iron this meant a saving of 5,200 steps per year. One of the mottos of every modern home is "Save your steps," and all present considered that the electric toaster and iron were foremost among appliances to make this motto possible.

A Book That Tells How to Increase Egg Production

Artificial illumination, to increase egg production, is one of the most important subjects before farmers to-day. Its practical value can scarcely be exaggerated. This method has been thoroughly tried out and approved by practical poultry keepers in all parts of the country, and its advantages scientifically demonstrated at colleges and experiment stations.

"Use of Artificial Light to Increase Egg Production" is an interesting book that gives complete information on this subject. It tells how the method was discovered and by whom. It describes different methods of lighting available for this purpose and how and when to use them. It also describes the changes that must be made in ordinary methods of feeding and care to get the best possible returns from fowls under lights.

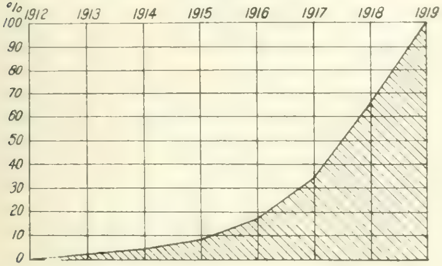
There are special articles by professors of poultry husbandry and by numerous commercial poultry keepers, all of whom write from their own personal experience. The book is illustrated with half-tones showing where lights are used, and there are four pages of three-color charts and tables of egg production comparing actual results with and without lights which prove the great advantages of this practice. It tells how to increase your winter egg yield and your winter profits; how to make late-hatched pullets lay better; how to get profitable winter productions from one and two-year-old hens, instead of keeping them as unproductive boarders all through the winter—everything of importance that is known on the subject. Contains 112 pages, 8½ by 12 inches, is printed on super-calendered book paper, well illustrated, with Sewell art cover. Price $1.50, postpaid to any address.

The Possibilities of Doing Electrical Business with the Farmers

By Mr. R. B. Harvey*

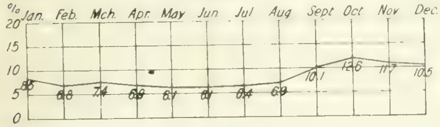
So great has been the demand of the farmers for lighting sets in the past few years that the manufacturers have not been able to supply the demand. This is true, in spite of the fact that the number of manufacturers of farm-lighting sets has increased tremendously. In 1920 farm lighting manufacturers expect to produce about $60,000,000 worth of plants and they will probably all be sold. This means that from 80,000 to 90,000 farms will be electrified by this means in 1920, and investigations indicate that each farmer spends, on an average of $136.00 for wiring equipment, $10.00 for lamps, and approximately $80.00 for appliances and motors, or a total of $226.00 immediately upon acquiring electricity for his farm.

Year When Plant Was Bought–112 Reports.
Chart "A"

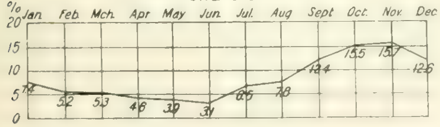


Since this great market is created as a result of the sale of farm lighting plants, such sources of revenue should not be neglected, especially when a large percentage of it is cash business. The reason that this is largely cash business is because the purchasing power of the farmer is increasing notwithstanding the seemingly heavy advance in the cost of farm operating equipment and supplies. During the year 1918 there was an increase of approximately 60 per cent. in the prices received by farmers for their products, while during this same year the increase in prices paid by farmers for articles of common use on the farm was only 30 per cent.

Receipts From Sales Of All Kinds.
Chart "B"



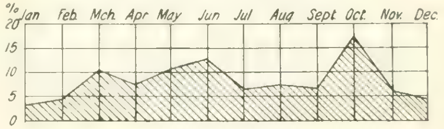
Receipts From Sale Of Crops
Chart "C"



In addition to the market created by the sale of farm lighting plants many jobbers and central stations are very active in building farm extension lines of high tension transmission lines, the purpose being to secure additional load for the central station and to establish a wider market for electrical goods. In the latter instance, naturally, the promoter of the extension enterprise takes advantage of the demand created.

Chart A shows the growth of the farm lighting plant business, and is based on a report of over 100 plant owners, stating the year in which each plant was bought. This business will undoubtedly continue to grow at this rate for two or three years, as it is a new product and the demand greatly exceeds the production.

Month When Plant Was Bought–108 Reports



The farmer, unlike the city man, is subject to certain conditions peculiar to his industry that affect his purchasing activities. There are busy seasons when planting and harvesting occupy his time from daybreak until dark. During these seasons he rarely is at liberty to make any but absolutely necessary purchases. His income is greater during certain seasons, therefore, the application of sales efforts should be confined to these seasons. Babson's report gives us a picture of the farmer's prosperous seasons which are indicated by charts B and C.

The opportunity recently presented itself to put the question to 108 farmers regarding the month of the year in which a certain labor-saving device was bought. This information shown in chart C indicates that the months of his purchases along improvement lines are during his seasons of maximum income.

It is an inherent trait of the farmer to continue to do business with the merchant who gives him a fair deal and good service. He makes periodical trips to his trading center, and questions involving the application, use and repairs of his farm machinery are discussed with his favorite dealer. Therefore, if he would keep abreast of the times and develop in direct proportion to his community, he cannot afford to overlook this very desirable market that is being developed at his very door.

In the West the Farmer Finds a Lighting Plant One of His Best Assets

In the West, where water power, comparatively speaking, is scarce, the isolated plant will naturally meet with a big demand. The following interesting letter from the Whelpton Electric Company of Wilkie, Sask., indicates that the people realize the value of electricity, for he says 'very few houses have been built in the last five years without having the wires put in while building." Mr. Whelpton's letter runs as follows:

"Electricity on the Farm" is only in its infancy in our district. We have installed five plants in a radius of say 45 miles and perhaps as many more have been installed by others.

In the same district we have, however, wired about 40 new houses ready for electric light, but owing to crop failures these have not yet installed the plant. This shows, however, that the farmers here are taken up with the idea, in fact, very few houses have been built in the last five years without at least getting the wires put in while building

---

*Manager Farm Lighting Section, Westinghouse Electric & Mfg. Co.

The plant we sell is a 50 light, run by a 3 h.p. kerosene, throttling governor engine, with a battery—usually a 100 ampere hour size. We did install one 25 light size, but think the 50 light size is better. Where the farmer has an engine suitable, we sell the plant separate.

The cost of operation for lighting only is very little, if any, more than the cost of burning kerosene in lamps and lanterns. It would not be any more except for the fact that more light is used when one has the convenience of a light at the turn of a switch.

The initial cost, with the cost of renewing the battery at the end of four or five years, is, in part at least, offset by the convenience, greater safety, better light, the time saved taken to keep lamps and lanterns cleaned, home comfort, etc.

We recommend placing the plant where the engine can be used for other work as much as possible. We do not recommend the extensive use of motors, or electric heating utensils with these plants, except for small work. One of our customers installed an electric washer, and has arranged it so that he can run the churn from the same motor. Another runs the washing machine direct from the engine, which is a better arrangement where it is feasible, as the time of charging battery is not noticed.

The running of the engine, ,say, one hour per day for pumping water, the balance of the power going into the storage battery, would in most cases be sufficient to supply all the light needed, even in winter time.

The Story of the Electric Iron as Told by Itself

Well, here I am, just as good looking as ever, but what is more to the point, just as efficient. I have now been working for Mrs. Anderson eighteen months and feel by no means at the end of my usefulness. I have distinct remembrance of the time I was left at her home to be cared for and to serve her. There was a lady in the house at the time whom I afterwards found to be her mother. She was all for old-fashioned ways and so when I was unwrapped and proudly displayed it to the old lady, she said: "Well, my dear, it looks pretty nice, but I always have my suspicions of articles—intended to give much wear—being made to look so well. Mark my words you will find that all that polish covers up some poor workmanship, or else it won't work at all." This made my mistress rather sad because she had not had much experience keeping house and was inclined to be influenced by her mother. However, she said: "Oh, mother, it can't be as bad as that, because the dealer gave me a guarantee, and besides I have bought several things from that store and never once have I had reason to complain." "Alright, my dear, have your own way, time will tell," and it has. My mistress has had no fault to find with me, except as she sometimes laughingly says to her husband, "that electric iron of mine makes ironing too easy."

Sometimes a friend will call who does her ironing in the old way and will express wonder that my mistress always seems so fresh, and without the slightest appearance [illegible] tired. I remember in particular an ironing day last summer when a lady visitor received the surprise of her life. Mrs. Anderson had just finished everything and put me away, when the door bell rang. It turned out to be a friend of her's who had come to ask her to go to a tennis party that afternoon at 4 o'clock. She promised to go, then invited her friend into the kitchen to talk with her while she put away the clothes just ironed. As she reached over to pick up the basket she unfortunately knocked a bowl of water over the nicely ironed things. The friend expressed sympathy because the clothes would have to be ironed again and the weather so hot. My mistress said it was too bad, but she had still an hour to spare before going out and would fix them up right away. Well, if you had seen the look of surprise on the visitor's face when she heard that, you would have laughed outright. To think of a person having already ironed that day and intending to go to a tennis party and play, starting in to iron again before going. But the surprise was greater when she saw the ease with which it was done, and how apparently my mistress was free from fatigue. Being an understanding woman she noted everything and asked a few questions, the result being that she went away with the full intention of getting an electric iron for herself. What my mistress told her was simply that in using me she did not have to suffer from the heat of the gas range, or coal stove in order to get me hot; she was not so tired at the end of the ironing because she had no occasion to be running from ironing table to stove and back; because of this she also saved time. Then, too, the iron felt so different in her hand being better balanced than the old irons, which saved her from having a sore wrist. Neither did she have to bother with a cloth with which to prevent herself from burning her hands, because the handle was always cool. Other points which she made clear was that no soap was necessary to clean me before applying me to the clothes. Then, too, I was so constructed that my heat was greater at the point, which is the place heat is most needed when ironing. She explained that I saved expense in gas bills, and also, because I was always hot as long as connected to electricity she needed none of my brothers to help her out. One other explanation she gave and that was, that because I was beautiful in design and finish she did not necessarily have to put me out of sight.

So the weeks pass by and lengthen into months, but it makes little difference to me. I am always ready when called upon and enjoy life very much. If any of my readers don't believe me, why get one of my brothers and satisfy yourself that all I have said is true. Why! it's ironing day to-day. I declare! I got so interested telling what I could do that I very nearly failed to be ready for what I have to do, and that would be a very poor recommendation. Good-bye!

The Aqua Water Heater

Mora and Mendoza of New York announce that they have appointed Mr. George H. Hurst of Antigonish, Nova Scotia, as their agent for the Aqua electric heater, for the Maritime Provinces. Mr. Hurst is carrying a large stock of these heaters and is prepared to make immediate deliveries. We understand the Aqua heater is meeting with the approval of the dealers in the United States, and have no doubt that the electrical dealers of the Maritime Provinces will find it a profitable device to handle.

The S. Morgan Smith Co., York, Pa., have secured a contract for the manufacture and installation of a 500 h.p. turbine in No. 1 pulpmill of the Chicoutimi Pulp & Paper Co., Ltd., Quebec.

The "Welcome Home" Salesmen's Club

Harry Clarke Tells of the Good Results From Co-operation Between the Different Branches of a Store's Activities

Roy Norton's home looked very cheery and comfortable to the other five members of the salesman's club as they entered from the rainstorm which swept the city streets. Such an evening was a good test of the loyalty of the members to the club, and none had failed.

They all chatted like magpies for about twenty minutes and then the meeting was called to order and Harry Clarke began to speak:

"This last week has been a most interesting one to me. The fact is I saw some splendid results from a definite attempt on the part of a contractor-dealer to get all the business he believes he has a right to in his home town. I tell you fellows that if a dealer once gets on the right track and is enthusiastic in his efforts to get business there is no stopping him.

It was on my last trip to his place, perhaps five months ago, that we had a conversation about the amount of business he was getting and the amount he thought he ought to be getting. It really began from his showing me a clipping which he had cut out of an electrical journal, which read: "All a fellow needs to do in this business is to find out who the people are who ought to use electric light but don't. Then ask himself why they don't, and the reasons he finds will give him some good talking points." That's all right as far as it goes, said he, but it doesn't go far enough. I've been in the electrical game for fifteen years now, and think I have a pretty good idea who the people are that need electricity and why they don't use it, but as far as I am concerned it has not brought me all the business I think is my share in this burg. Now, what's the trouble and who's to blame? If I am, then I am going to alter it and pretty quick, too."

Well, we talked the matter over very thoroughly and I gave him the benefit of my experience and casually droppd a few hints regarding points on which it appeared to me he fell down. To let him thrash the matter out for himself seemed to me the best policy, and for that reason I gave him no definite suggestions.

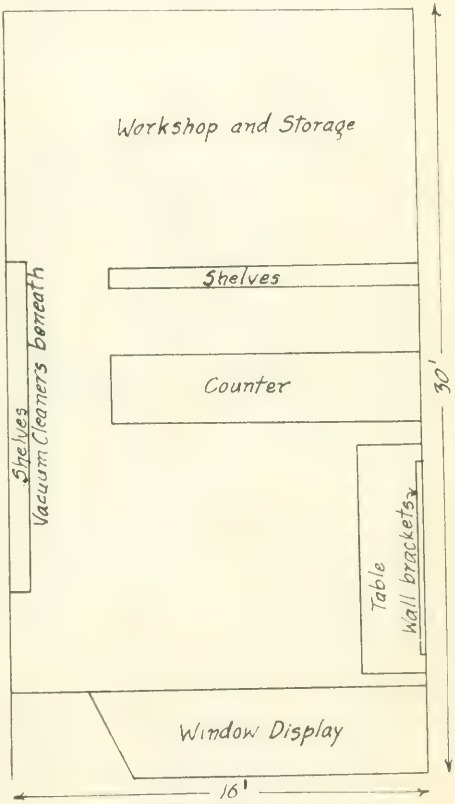
When I saw him the other day he was simply tickled to death with himself. Trade was coming his way that he had never had before and he was perfectly satisfied that he was travelling on the right lines at last. To quote his own words: "After you left I set about finding where the real trouble was for I had come to the conclusion that there wasn't an electrical thing on the market that couldn't be sold if only a man knew how to sell." How he found out where he was wrong the following details will show.

With a notebook in his hand he started a systematic survey of his whole business, starting first with his window display. When he was finished his notes showed him that:

The window display was fair, but wanting in purpose.
The store display was poor and without order or relation to his window display.
The stock was good, but there was a too large percentage of old stock.
The store equipment was amateurish and old-fashioned.
Advertising haphazard, and
Accounting in poor shape.

He then considered the report as a whole and the final decision at which he arrived was that there was no co-operation or system in the store, every part seemed to be accidental. Neither was there any economy of space or time, consequently none of money.

As all this sank into his mind he felt, as he said to me, "some staggered." A few hours of systematic investigation had taught him that what he had thought was a fairly well ordered business was nothing more or less than chaos. When this dawned upon him he lost no time in bemoaning his past foolishness, but literally took off his coat and rolled up his shirt sleeves and set to work to reduce chaos to order, and when that was done to his satisfaction, do some advertising and campaign work.

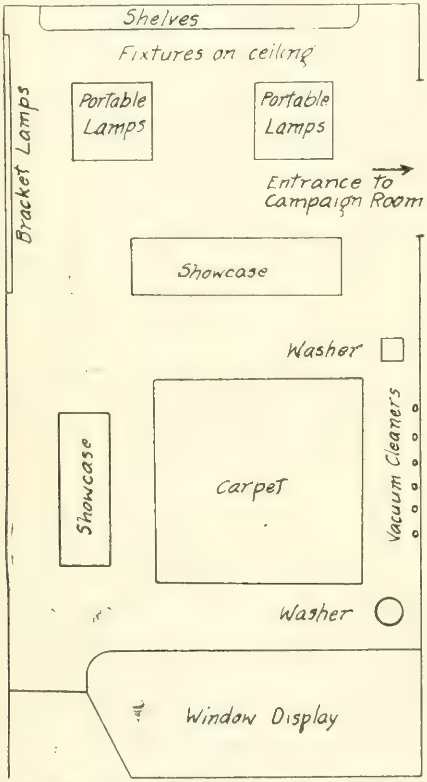


The arrangement of the store was bad

Starting with the window he overhauled the whole store. All articles which he had had in stock over a certain length of time he placed aside. Everything else he cleaned and arranged neatly. He got rid of his large counter and replaced it with two showcases. The store next door he owned and rented to a barber. The back room of this store was not in use, so he closed up the entrance from the barber's shop and made a portico entrance from his own store; this he intended to use as a campaign room. His store he had thoroughly painted and hardwood floors laid. Next he hired a competent bookkeeper and tackled the books, finding to his surprise that he had a lot of back debts owing him which he had from time to time overlooked. When this was done he was ready for business. The two rough plans I will show you later will give you some idea of the change he made in the store.

All this took him about two weeks to complete. In the meantime he had taken half a page of advertising space in the local paper making the simple statement that Fred Galbraith would be prepared to give better service after alterations were completed, and inviting the readers to keep their eyes open for further announcements.

When all was ready he announced a special sale of shop-soiled articles at much reduced prices and invited the public to drop in and see the things for themselves. As he explained to me, "I had had money tied up in those things for years and even tho' I sold some of them at a loss it would be better to have the money to use for better-selling goods and make a quick turnover than keep the store lumbered up with the hope of some day getting my price."



What the plan looked like with a little re-arrangement

He made it a rule to do an hour's telephoning every day. To some he spoke about new devices he had recently stocked to others it was a question of following up suggestions made in the store or enquiries received from customers.

When his sale of shop-soiled goods was over he announced through the papers that he would hold an "advertisement competition." For this purpose he pasted a number of popular advertisements on cards and hung them on the wall. He removed the names of the firms advertising and any lettering that might give away too easily the identification of the advertisement. Twenty of these were displayed in the "Campaign Room" and a prize was offered to those who could give a complete list of the firms thus advertised. Each one wanting to compete was given a card on which to write the answers, and their own name and address. Four were allowed in the room at a time and a clerk was on duty to see that no one used magazines from which to crib the answers. The cards had to be handed in before the competitor left the store.

This scheme provided Galbraith with a splendid mailing list. It was a huge success and brought him many new customers. Many people made enquries regarding certain appliances which he had in stock, and with some he was able to make a sale. As long as there was anyone in the store he had one or another of the appliances working and they never failed to arouse interest.

Every week since he has had some kind of a competition or campaign in his special room. One week he provided afternoon tea for all who spent above a certain amount in the store using electric apparatus, of course, with which to make the tea and toast.

In addition to all this he has opened up an information bureau and provides information about things electrical, as far as he is able, to all enquirers, free of charge.

He has made several other improvements besides those I have mentioned, all of which have aided in making his the finest store in the town.

Clarke then produced the plans and every one gathered around the table and discussed the good and bad points of the improvements effected by the enterprising dealer.

Window Dressing Takes Little Time

Recently the writer went with an expert window dresser to a small store, the window of which the latter had undertaken to dress. He had nothing to work with except the articles for display, and none too many of those. The window was thirteen feet long and three feet deep. The background was a green curtain, and the floor was varnished. When we arrived the window was empty. The expert decided to make it a lamp window with just a suggestion of small appliances, helped out with a few display cards which he had taken with him. Fifteen minutes after starting the window was completed. Allowing another fifteen minutes for the time the dealer spent in removing the old display and dusting the window space, and the whole operation took but half an hour. The result was a neat, uncrowded, attractive window. One very pointed thing I heard the expert say to the dealer was: "I hope you do not mind my robbing the show tables to decorate the window, but I take it for granted that you have the goods for sale and not for show."

The Latest Stunt in Advertising

Here is the latest advertising stunt of an enterprising contractor dealer. With every purchase made of an electric appliance he gives to the customer a toy model of one of the remaining appliances. This is for the children, and he believes that the presence in the home of such a toy helps to create in the father or mother the desire for the real article. Sometimes he varies this gift by giving a cut-out book instead of a toy. This book contains silhouettes of all the electrical appliances, and each silhouette has the dealer's name and address printed on it, and also the name of the article. Nothing amuses children more than a pair of scissors and a piece of paper to cut, and because they leave their toys lying around there is always a silent salesman in the home where this dealer's gifts are enjoyed.

WINDOW BACKGROUNDS

The Most Expensive Dressing is Not Necessarily the Most Effective. Interchangeable Designs Worked Out With a Little Ingenuity

By Mr. F. S. Beaumont*

A window background can be as costly or as cheap as the dealer has a mind, but the results will not necessarily be in proportion. What I mean is that cheap material might be made to give better results than costly material; it depends mainly upon the man who dresses the window. Some time ago I had, in one of our windows, a background representing spring. A young fellow whose business it is to paint such backgrounds, asked to be given the next chance to supply such scenes. His price was sixty cents a square foot. The background measured fifty square feet, so the cost would have been $30.00. Whether or not he had noticed that it was not painted at all, but merely wallpaper fixed to unbleached cotton, I cannot say, but the cost, as far as I was concerned, was only $7.85 for all material used. The time taken was 2½ hours. The result, however, was the same. A window does not have to be turned into a literal art gallery to be attractive, but a little thought and judgment will make possible at comparatively little expense window backgrounds that cannot fail to be admired.

Equipment Gradually Accumulated

One thing is certain, that unless the store is a large one and the dealer has plenty of money for such purposes as aids to display the equipment of such will be a matter of gradual accumulation. To this end it is well to remember that nothing need be wasted. The many pieces of cardboard or beaver board, small pieces of wood, boxes and so forth can be all utilized to make various things for the window. For some time now I have had a room partitioned off in the basement of the store which is used solely for a stockroom of window display material.

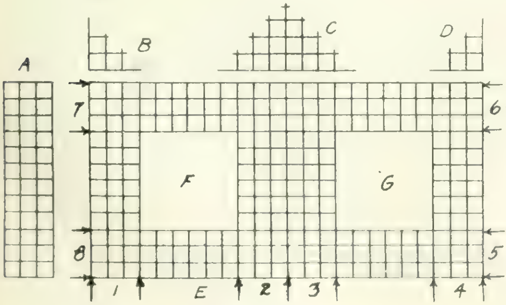


Fig. 1

It has been found from experience that with care in design when making backgrounds that they can be altered to form different shapes and designs with but little trouble so that monotony is avoided. For instance a very common method of making backgrounds is the use of lattice work. The accompanying sketches show three different backgrounds from the two sets of frames. With little additions more and prettier designs can be constructed. The same can be said of the use of pillars and, indeed, almost any equipment used for this purpose, if in the designing such a use is considered.

Because of the nature of electrical goods it is more difficult to harmonize a background with the goods displayed. After a week spent in Chicago I came away without having seen one window display helped out with a background in any of the large electrical stores. Personally, I make use of velours, lattice work and pillars. Velours, which is in the nature of velvet, is one of the best means of decoration, but is very costly. Its main value is that it shows up nickle goods to the best advantage. The pillars and scenic effect, or the lattice work is more for special windows when only one kind or class of goods are on display. For special occasions of course special equipment is necessary.

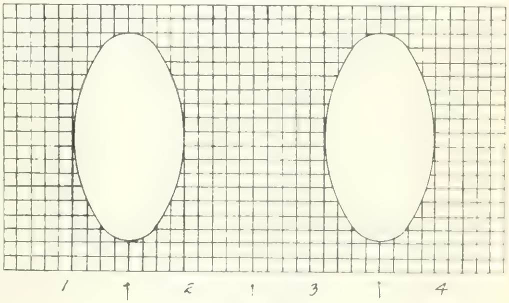


Fig. 2

Scenic Effect

For general use I have three frames made to fit in between pillars. For each of these frames are four other frames over which is stretched unbleached cotton and on which is pasted wallpaper designs representing the four seasons. These can be very quickly changed, or if pillars are desired without the scenes, curtains or velours can be hung on rods stretched between the pillars. The pillars can either be made in the form of a frame with wallpaper or other material tacked on to give the necessary effect, or they can be boarded in completely and painted. In either case they are there for use at any time.

The best background for co-operation with special displays of appliances is obviously to produce as far as possible the type of room in which the appliance will be used. A kitchen for ranges, washers, or irons. A living room for the vacuum cleaner, or a dining room for toasters and percolators.

Nothing Need Be Wasted

Previously I mentioned that nothing need be wasted, because a use can be found for almost every kind of material that comes into a store. For instance a window display to suggest good lighting in buildings can be made from old show cards. Several of these cut in silhouette represent several buildings making up part of a street, and with windows cut out and white tissue paper pasted over will, when lit up at night, give a very good effect. With a hammer and chisel and a piece of hardwood in addition to the card such a trim can be made in a very short time and the value gained will more than make up for the labor put into it. Small pieces of beaver board or cardboard cut into squares of 12 inches or smaller, and painted to represent tiles, can be laid on the floor of the window when designing a kitchen.

---

*Salesman and window dresser, Toronto Hydro-Electric System.

Low brick walls with pillars at each end can be made from odd pieces of wood and covered with paper painted to represent brick. It is very inexpensive, but very valuable for effect. I have always found, however, that even though such means of decoration cost little it pays to make a neat finish so as not to give a cheap appearance. A few rough edges here and a poor joint there will spoil the whole effect.

Suitable for Small Dealer

Sometimes it is said that all such work is valuable for the big store only. While it is true that the elaborate display is best suited to large windows and comes more within the reach of such a dealer's pocket, yet the background and various aids to display are of equal importance to the small dealer. It is merely a matter of perspective and proportion. For instance, the use of lattice work, with the addition of a little Japanese wistaria, can be used in the smallest windows. The difficulty of finding room to store the few things needed for a small store window might be overcome by utilizing the space underneath the window floor. As a rule this space is either not used at all or used for junk.

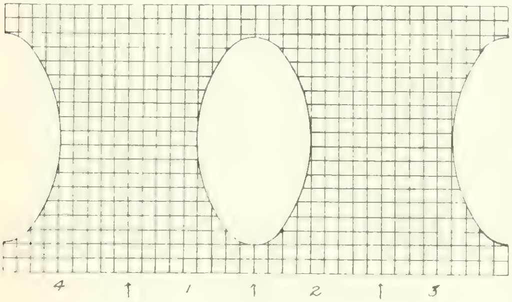


Fig. 3

The point that I want to make most clear is that it is worth a little sacrifice of time and money to utilize such aids. If it is true that many large firms spend more money on equipment for window displays than for store equipment then the small dealer need not fear to spend a little on such aids.

Eight frames of lattice work constructed as in "A" will make frames of "E," Fig. 1. Parts B, C & D can be used if required. The openings F & G can either be left vacant or filled in with country scenes.

By removing 5 & 8 and placing four parts similar to "B" in the top corners of F & G another design is obtained.

Again, by placing the whole eight frames side by side, a complete lattice background is obtained without openings.

Sprays of Japanese wistaria twined in the lattice work makes a very pretty background. Climbing plants might be used in place of the wistaria, or in the fall, red maple leaves and sprays of golden rod.

The background shown in Fig 2 should be made in four parts. By rearranging, Fig. 3 is obtained.

It is quite possible to make other designs, such as arranging the parts so that the long way of the ovals are horitzontal. Again the straight edges can be butted together, forming a design with half ovals at the top and bottom.

Combinations of parts of Fig. 1 and Fig. 2 can also be used with good effect.

If the reader will take a piece of paper and a pencil he will be surprised how many designs for pretty backgrounds the two sets of frames will make.

What is Your Policy? Honesty is Not Confined to Persons

A prominent speaker once said: "Honesty is not merely the best policy; it is the only policy."

There was a time when it was commonly asserted that a man could not enter business and remain honest. That is, he might keep within the law of the land, and yet not be within the law of conscience. To some extent this was true of the past, but it is not so true of the present. Business men have learned that success is not judged by immediate results, or even by the size of a bank account, but rather by the judgment of their clientele after years of business dealings. A successful business is a stable business, and a stable business is one in which the customers have become more in the nature of friends. How else would have arisen the demand for bonds and marked cheques when sending in tenders if the business man of the past had not violated his trust?

But honesty is not merely a relationship between man and man, or between bodies of men and similar bodies; it is also a relationship between man and things, between a man and his business. In brief, it is the fair golden rule adjustment between man and man, and man and things.

Two farmers owning property on opposite sides of the same road were labelled by the quality of the crops each produced. The land was of the same nature and both farmers had had the same opportunities in life, yet the farm of one produced splendid crops and that of the other, poor crops. The difference was accounted for by the fact that one man considered his land; never grew a crop of the same nature on the same piece of land two years handrunning; once in a period gave certain fields a rest by turning them into pasture land; fertilized wisely and so forth. The other neglected these principles of scientific farming, and because of this dishonesty towards his land failed to make good.

The electrical dealer shows his honesty towards his business by carefully handling his merchandise; cleaning it; displaying it with a purpose; neglecting nothing that will cause deterioration in its value. In other words, giving his merchandise a chance to speak for itself.

National Association Convention Oct. 4-9

The National Association of Electrical Contractors and Dealers announce that owing to increased cost of production it has been found necessary to raise the price of their Standard Cost Accounting System. The price to members will, in future, be $35.00—which represents actual cost—and to non-members $50.00; these prices are f.o.b.

The Association President announces that preparations are well advanced for the general convention which is to held in Baltimore during the week Oct. 4-9.

The Montreal Electrical Workers Demand Eighty Cents an Hour and Closed Shop

A special meeting of the Electrical Contractors' Association of Montreal was held on May 26th, at Montreal, to discuss the demands submitted to the Association by the International Brotherhood of Electrical Workers. After reading clause 12, which enforced the closed shop principle, it was unanimously agreed that a communication be sent to the Union stating that the Association were in favor of the open shop, and until clause 12 was considerably altered they would not entertain the demands.

The following is a list of the demands made by the Union:

Article 1. Hours of Work

Clause A.—Eight hours shall constitute a day's work, to be worked between the hours of 8 a.m. and 5 p.m., excepting Saturdays, which will be from 8 a.m. to 12 noon, making a forty-four hour week.

Clause B.—Double and triple shifts: When double or triple shifts shall be employed, the working hours shall be eight hours per shift, and forty-eight hours per week, to be worked as follows: from 7 a.m. to 3 p.m. and from 3 p.m. to 11 p.m. and from 11 p.m. to 7 a.m., with an allowance of twenty minutes after four hours work has been performed for lunch without loss of time to the employee.

Article 2. Overtime

Clause A.—All hours worked in excess of the working hours, as specified in Article 1, shall be paid for at overtime rates.

Clause B. In the case of one shift, all labor over eight hours per day, shall be paid for at the rate of time and one-half until midnight, after which double time shall be paid. Saturdays to be a half-holiday: Saturday work between 12 noon, and 5 p.m. to be paid for at the rate of time and one-half, and double time after 5 p.m.

Clause C.—In the case of double or triple shifts, all overtime shall be paid for at the rate of time and one-half, Sundays and all legal holidays—New Year's Day, Good Friday, Victoria Day, Dominion Day, Labor Day, Thanksgiving Day, Christmas Day, also any legal holiday proclaimed by the Federal Government shall be paid for at the rate of double time. Should any of these holidays fall on a Sunday the day on which the holiday is observed by the public shall be paid for at double time.

Article 3. Change of Shifts

In cases where men are permanently employed on one shift and are required to transfer from one to another, or are required to work two shifts or a part of two shifts, same shall be paid at the rate of time and one-half for the second shift, but no man shall be allowed to work more than two shifts of eight hours in any twenty-four.

Article 4.—It is understood that all overtime will be eliminated as far as possible, except in cases of necessity.

Article 5.—There shall be no limitation in any branch of the trade as to the amount of work a man shall perform during a working day.

Article 6. Starting Time

Clause A. All men shall be on the job ready to commence work at the regular hour for starting work, otherwise men shall be docked for such time lost.

Clause B.—Any employee not notified the night previous when not required on the job the following day, such employee shall have the right to claim two hours pay for having reported on the job.

Article 7. Grievances

All grievances must first be reported to the foreman in charge of the trade effected by the recognized shop steward appointed by his union, and no discrimination shall be made against the stewards for handling any grievances. Should settlement be impossible, the said steward, in conjunction with his business agent, shall take up the grievance with the party of the second part who shall endeavor to reach a settlement and should it be impossible to come to an understanding, the grievance shall be submitted to an arbitration board composed of two from each side, and they shall appoint a fifth party as judge. In the event of these four not being agreeable to the appointing of the fifth party, one shall be appointed by a Judge of the Superior Court, who shall be a disinterested party, and should it be impossible to come to an understanding all trades on the job where such grievance takes place, shall be effected, but no strike or lockout shall take place until two weeks time has elapsed from the time the said grievance has been given the party of the second part.

Article 8. Sub-Contracts

All sub-contracts let by the party of the second part, he shall in no case sublet such contracts on any other conditions than the conditions, wages, etc., as provided for in this agreement.

Article 9. Shortage of Labor

In the event of their being a shortage of labor from any cause, where possible the Local Union which covers such branch of the trade, shall be notified with no less than twenty-four hours notice, and they shall endeavor to secure for the party of the second part such labor required. Failing their being able to supply the demand, the party of the second part shall be allowed to hire such labor where he deems fit.

Article 10.

No employer shall be given any better terms or conditions regarding hours of labor, wages per hour, etc., than is specified by this agreement.

Article 11

No person shall have the right to interfere with the men working on the job during working hours, except the official representative of the Union, who may consult with the shop steward on the job.

Members of the International Brotherhood of Electrical Workers only to be employed or men on permits issued by the business representative of the Union.

Article 13. Out of Town

In the case of out-of-town work, the employer shall pay suburban car-fares, railway or boat fares, and all expenses for room and board.

The party of the first part do not bind themselves to work upon any job where there is any labor troubles

Article 15. Rates of Pay

The following rates of pay shall apply: Electricians, 80c per hour; helpers, 55c per-hour. Charge hands to receive 10c per hour over and above the rate of the men over whom they have charge.

This Agreement

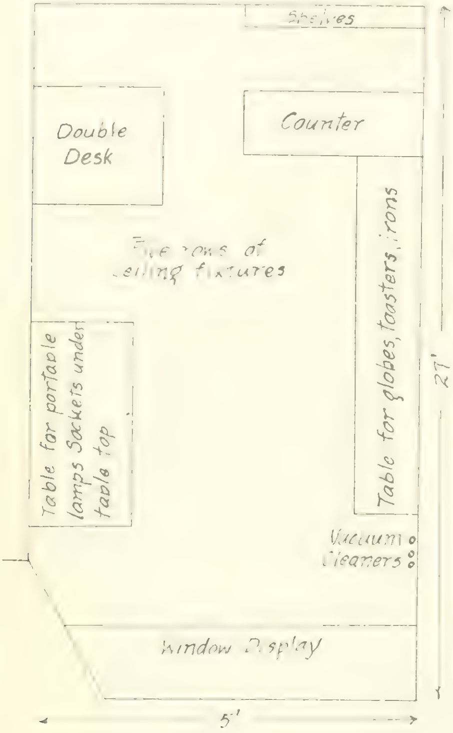
This agreement shall remain in force from date of signing same to May 1st, 1921.

The Montreal & Southern Counties Railway Company have been authorized by the Railway Commission to increase their rates by 20 per cent., on the ground of higher cost of operation.

A New Electrical Store

[illegible] & J. M. Douglas, the latter of whom served overseas with the railway troops. They will stock electric fixtures and supplies, also some appliances. At present they are selling the Premier vacuum cleaner.

The store, a plan of which accompanies this announcement, [illegible] and there is no doubt that with the further development of North Toronto, this firm willl have every chance to grow with it.


Shelves
Double Desk
Counter
Five rows of ceiling fixtures
Table for globes, toasters, irons
27'
Table for portable lamps Sockets under table top
Vacuum Cleaners
Window Display
5'

Plan of Douglas Bros.' Store

The store is 15 ft. wide by 27 ft. deep, with a window display space of 12 ft. long in the front and 13 ft. 6 in. long at the back. The depth is 3 ft.

At present tables are the chief means of display inside the store, but no doubt as the business grows showcases will be added, which will prove a great advantage.

The City of Montreal has reached an agreement with the Montreal Light, Heat & Power Company to renew the lighting contract at $65 per standard lamp, an increase of $1.50 per lamp. The Montreal Public Service Corporation will obtain the same rate for lighting certain of the outlying districts.

The Cedar Rapids Manufacturing & Power Company is applying to the Minister of Public Works, Ottawa, for permission to build a wing dam in the St. Lawrence River at Cedar Rapids adjoining the company's property.

New Shunts for Switchboard Use

Although the type G ammeter shunts recently developed by the Westinghouse company are designed for use on horizontal bus-bars, they will operate in any position without overheating. The terminal castings of 300 amp. are slotted, to receive one ¼ in. copper bar per slot. Sizes ranging from 10 to 300 amp. are mounted on a light micarta strip which takes all strain from bus-bar distortion, from the terminal lug and manganin plate joint. These shunts operate at a temperature rise of 30 deg. C if connected to bus-bars of ample conductivity when carrying two-thirds of their rated current which should correspond to the normal full-load of the circuit. They are adjusted for 50 milli-volts drop at full rated current and are interchangeable with other standard makes of the same rating. The resistance plates of the type G shunts have a negligible temperature coefficient and thermo-electro-motive force, thus avoiding errors due to heating, which may amount to several per cent. in other resistor materials.

Drury the Contractor

Following the recent provincial election in Ontario when the U. F. O. party came into power with Mr. E. C. Drury as Premier, Mr. E. A. Drury, electrical contractor-dealer on St. Clair Ave., W., Toronto, came in for a good deal of jollying from his friends. Like the shrewd business man he is, E. A. decided to "cash in" on the coincidence in names and among other stunts distributed a number of blotters worded as herewith. It is safe to say this unique blotter has been the means of impressing the name Drury.

DON'T BLOT OUT THE FACT

E. A. DRURY

Has not been
ELECTED
PREMIER OF ONTARIO
so is still the
Electrical Contractor

He Will Wire your house
Install extra outlets
Install fuse plugs
Repair lights.

Keep Your Door Bell Ringing

He Sells Vacuum Cleaners
Electric Grills
Toasters Irons
Electric Washing Machines
[illegible]

Phone for Prompt and Efficient Service, you will

ELECT
HIM
PREMIER
Electrical Contractor

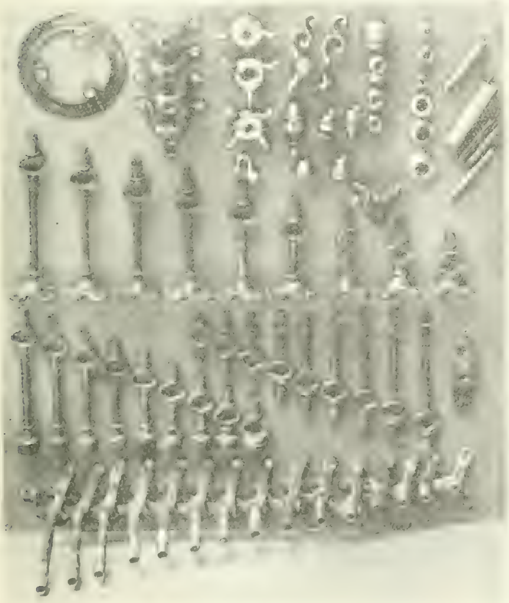
Phone—Hillcrest 5098
154-174 Oakwood Ave.

The "Time-Saver" Electric Washer IS a TIME SAVER

A Revolution in Fixture Installation

[illegible] their many unsatisfactory features, seems to be now under way in the development of the non-twist canopy ring, commonly called the N-T ring, which is being placed on the [illegible] The illustrations which we show here present a selecti[illegible] of various types of the N-T ring, serving both as independent fittings for the connecting to them of standard fixture arms, and also in the making up in one unit of a fixture arm fitted with an N-T ring. Some of these arms, it will be noted, are of different types of tube construction, and others are of cast metal. In applying the N-T ring principle, the inventor of the ring has developed a series of outlet fittings, taking care of ordinary plaster wall where there is no outlet box, construction, including conduit systems, and the attaching to gas pipes, either used with or without insulation joints. These fittings are being made in malleable iron and are of one piece construction, as will be seen by the illustrations accompanying this article.

The various types of canopies, including a larger range than is ordinarily feasible, with slip canopy formation, [illegible]



Independent fittings for [illegible] standard fixture [illegible]

or pressed canopies, cast canopies of any metal, and the very novel introduction of opaque glass. It is a special feature of note that in the application of the opaque glass canopies for bathroom and kitchen use particularly, also hospital work, an ideal sanitary fitting is developed, being free from shock danger and enabling same to be cleaned without tarnishing.

The application of non-twist rings to arms for fixtures has also been developed and is particularly desirable on fixtures for candle design. This application eliminates wire abrasion causing short circuits and enables the fixture [illegible]

[illegible]

[illegible] order that it be perfect in every detail, was made to the [illegible] with an unlooked for reception and appreciation by the

Fixture arms fitted with N-T rings

trade generally, in most cases orders having been placed for early deliveries.

The company is at the present time introducing their goods to the Montreal trade, for which purpose their representatives, Mr. H. C. Tovell and Mr. A. L. Mackin, are in Montreal.

There are many features which might be added, but one of particular interest is the method of fixing an extra outlet on the canopy for an independent socket apart from that on the fixture arm for lighting purposes, which extra socket enables the connection of such small electrical devices as curling tongs, small water heaters and so forth, avoiding the defacing or dismantling of the bracket fixture for this purpose, which is usually done.

At the present time the company is taking up the matter [illegible]

A[illegible] introducing N-T products to the trade. Mr. H. C. Tovell (left), Mr. A. L. Mackin (right) placed on the American market at an early date, the method of production by the company being one of the production of a range of arms together with independent non-twist rings, to which chain and other fittings may be connected, also a range of canopies of various materials and designs, and, for use together with these, a range of outlet fittings for the various requirements of installation, all of which are interchangeable and which, with the variety of finish from a very moderate line of design, enables a most extensive combination of various parts to be most effectively carried out.

The Thermo Electric Heater

In our last issue we referred to a new heater which was illustrated and described as the McDonald heater. This should strictly have been called the "Thermo Electric" heater, which is being placed on the market by the Canadian Electrical Products Company of Brantford. The error arose out of the fact that the heater was the invention of Mr. McDonald.

A Possible Misundertanding

Owing to the similarity of the names of the George Cutter Company and the Cutter Electrical and Manufacturing Company some misunderstanding has arisen over a recent announcement that the George Cutter Company had been absorbed by the Westinghouse Company, the former company being referred to merely as the Cutter Company. We merely wish to draw attention to the fact that this new business relationship refers only to the George Cutter Company and does not refer in any way to the Cutter Electrical & Manufacturing Company, which we are advised has not changed its identity in any respect whatever.

A Recent Experiment in Wireless Telephony

Transmitting a concert by wireless telephony was a recent experiment of the Marconi Wireless Telegraphs of Canada. The concert was staged in the top floor offices of the Marconi Building, Montreal, Que., while the audience was gathered at the Cheateau Laurier, Ottawa, Ont., a distance of 100 miles. The latter was represented by members of McGill University, Royal Society of Canada and the Naval Service. The programme consisted of pieces played on the gramophone, solos by a lady and spoken messages. An amplifier was installed at the Ottawa end, and as a result the concert was heard fairly plainly, but at Montreal, when the audience was requested to give a return concert, hearing was rather indistinct. The explanation given for this was the amount of noise from the city and the fact that they had no amplifier attached at the Montreal end.

Fire at Newmarket Pumping Station

The Newmarket Pumping Station was destroyed by fire during the night of May 26th. The equipment destroyed included the motor driving the air compressor, two other motors used for pumping water, together with the main switchboard which included a 4100 volt power panel for town supply, three separate street lighting panels, a panel for residence and commercial lighting and an instrument with graphic and polyphase wattmeters. It is worthy of note that the fire occurred at 3 o'clock in the morning and by 11 a.m. of the same day the engineering department of the Toronto and York Radial Ry. Co. had all the services in operation as usual. This was made possible owing to the special distribution system upon which this company operate, ie., the combination of radial railway supply with power and light service. The advantages of this combination are spoken of elsewhere in this issue in connection with the supply of power and light to farmers.

Mr. Alex. Wilson, Consulting Engineer

Mr. Alex. Wilson, who is now in business as a consulting engineer with an office at the Yorkshire Building, Montreal, graduated from McGill University with the degree of B.Sc., in electrical and mechanical engineering. From 1910 to 1912 he was on the staff of the Shawinigan Water & Power Co., and from the latter year to 1915 was with the Cedar Rapids Manufacturing & Power Co., being assistant electrical engineer engaged on the design and supervision of the electrical installation of the plant, with 100,000 h.p. development. When the plant was completed, Mr. Wilson was appointed plant superintendent, later joining the Montreal Light, Heat & Power Company as engineer of electrical distribution. From 1916 to 1919 he was overseas, and on his return was appointed assistant to Mr. R. M. Wilson, chief electrical engineer of the Montreal Light, Heat & Power Co. He commenced business on his own account in the early part of this year. He is associate member of A.I.E.E. and of the I.E.S., and a member of the Canadian Electrical Association.

The employees of the Montreal Tramways Company have declined to accept an offer of $250,000 to $300,000 made by the Tramways Commission to supplement their wages. The offer refers only to certain classes of shopmen and not to the men on the cars. The Union has asked for a Board of Conciliation under the Lemieux Act, to consider the claim of $3,500,000 for additional wages.

Brig.-Gen. A. L. Macnaughton, C.M.G., D.S.O., was recently entertained at luncheon at the Engineers' Club, Montreal, by the staff of the Department of Electrical Engineering of McGill University, (of which he was a member previous to the war), together with members of the Department of Physics. The luncheon was presided over by Dr. L. A. Herdt, professor of electrical engineering, and among others present were: Professor C. V. Christie, Professor E. Godfrey Burr, Dr. L. V. King, Dr. Gray, of the Department of Physics, and Mr. A. Mathers, a former colleague of General Macnaughton.

New Firms

Insulation & Moulding Products, Ltd., is a new firm incorporated for the purpose of manufacturing insulating materials and electrical compounds, with head office at Toronto, Ont. The firm is capitalized at $80,000.

Application for incorporation of a company, headed by Capt. J. W. Dorsey, professor at the University of Manitoba, with a total capital stock of $500,000, has been made at the office of the provincial secretary, Winnipeg, Man. The name of the new company will be the Dorsey Electric Laboratories, Limited.

The Toronto Electrical Supply Co. is a new firm incorporated to carry on business as manufacturers, and wholesale and retail dealers in all kinds of electrical supplies and appliances. Head office, Toronto; capital, $100,000.

A new firm under the name of Canadian Technical Products Co., Ltd., has been incorporated for the purpose of manufacturing, importing and exporting motors and dynamos, and machinery of every kind. The firm is capitalized at $100,000, with headquarters at Toronto, Ont.

Mr. Brock Snyder has recently opened a plant at Grimsby, Ont., for the manufacture of the Economic electric iron. Mr. Snyder was formerly superintendent of the Radiant Electric Co., Ltd., of Grimsby, Ont. The new iron is claimed to have a number of features.

Current News and Notes

Brantford, Ont.

The Grand River Rly., Galt, Ont., are erecting a new transformer sub-station and will let the electrical work. Address correspondence to the superintendent, Mr. M. W. Kirkwood.

Brandon, Man.

Messrs. Jordan & Overs, C. P. R. Bldg., Winnipeg, are calling for tenders for the electrical work on the new nurses' home at the Brandon Asylum, Brandon, Man.

The Brandon Board of Trade has decided to ask the provincial government to take up the proposition of developing power for Brandon at Currie's Landing, eight miles east of the city.

Coleman, Alta.

The electrical work on the new school at Coleman, Alta., will be let. General contractor, Mr. E. Disney, Coleman, Alta.

Colborne, Ont.

The owner of the Colborne Electric Light Plant, Mr. G. M. Peebles, has offered to sell the system to the corporation on reasonable terms, and at a valuation to be determined by experts of the Ontario Hydro-electric Power Commission.

Coquitlam, B. C.

Messrs. Mundy, Rowland & Co., Standard Bank Bldg., Vancouver, B. C., have been awarded the contract for the electrical work of the Gregory Rubber & Tire Co.'s plant at Coquitlam, B. C. The contract includes wiring and lighting installation, transformers and several electrical motors for unit power plants.

Cap De La Madeleine, Que.

Mr. P. Rachon, 84 Royale, Three Rivers, Que., has been awarded the contract for electric wiring a terrace of houses at Cap De La Madeleine, Que.

Mr. P. Lacroix, Pont St. Maurice, Que., has been awarded the contract for electrical work on 20 semi-detached residences at Cap De La Madeleine, Que.

Edmonton, Alta.

Two million dollars, to be spent on new telephone construction, will come into the provincial treasury as the proceeds of a bond sale put through by Hon. C. R. Mitchell, provincial treasurer.

Fort William, Ont.

Messrs. Mahon Bros., Fort William, Ont., have been awarded the contract for the electrical work on the new car barns at Fort William, Ont.

Hamilton, Ont.

The electrical wiremen of Hamilton have agreed to accept 85 cents per hour. They asked for 90 cents per hour. The question of a closed shop was left over for discussion in conference.

The Thomas Construction Co., 215 King St. E., Hamilton, Ont., will purchase all the electric supplies for 24 residences in that city.

Liverpool, N. S.

The town council have received a report from Smart & Burnett, consulting engineers, Montreal, recommending that the power transmission line from the power station to the town be rebuilt and that the voltage be raised from 2400 to 6600.

London, Ont.

The Taylor Campbell Co., 237 Dundas St., London, Ont., have been awarded the contract for electric wiring the new branch of the Bank of Montreal, on Dundas St., London, Ont.

The strike of London street railway employees came to an end with the men going back to work at the old rate and with the Railway Board in Control. The understanding is that the men are to receive all surplus earnings, over operating expenses, divided proportionately among them. The control by the Railway Board is only tentative while investigations are being carried out.

Montreal, Que.

Mr. Arthur Leduc, 318 Fabre St., Montreal, is the general contractor for Messrs. J. P. O'Shea & Co.'s new factory on Perrault Lane, Montreal, and will sub-let the electrical work.

The Shawinigan Water & Power Co., Montreal, are erecting a steel tower line from Shawinigan Falls to Montreal, Que. They are also installing a transmission line from Victoriaville, Que., to Thetford Mines, Que.

The Montreal Electrical Commission, together with representatives of the Montreal Light, Heat and Power Company, the Montreal Public Service Corporation, the Montreal Tramways Company, the G. N. W. Telegraphs and C. P. R. Telegraphs, have requested the Montreal Administrative Commission for permission to postpone the construction of underground conduits for electric wires in one district, stating as their reason that the expense would be prohibitive. The Commission have promised to look into the matter.

The Surrey Electric Co. is opening up a store at 243 McCord St., Montreal.

The Regent Engineering Co., 4 Bronson St., Montreal, have been awarded the contract for the electrical work on the new Hebrew school at 953 St. Urbain St., Montreal.

Messrs. Mitchell Holland Co. Ltd., 589 St. Catherine St., Montreal, have been awarded the contract for electrical work in stores on St. James St., Montreal.

The Northern Electric Co. Ltd., contemplate making additions to their factory on Shearer St., Montreal.

Mr. John Quinlan, 1165 Green Ave., Montreal, general contractor for the new R. C. church on Western Ave., Westmount, will sub-let the electrical work.

The contracts for two new electric pumps let by the Montreal city council to the E. Laurie Co., and the Fraser & Chalmers Co., of Canada, are for $45,000 and $50,154 respectively

Moncton, N. B.

Mr. Roy Summer, Main St., Moncton, N. B., has let the electrical work of his new store on Main St., Moncton, to the T. Johnston Co. Ltd., of that town.

Newmarket, Ont.

The York County Council are calling for tenders for a [illegible] and wiring of York County Industrial Home, at Newmarket, Ont.

Ottawa, Ont.

The city council of Ottawa, Hydro-electric Dept., are [illegible] a white way system on Powell Ave., Ottawa. Ornamental poles and wire will be needed. Correspondence should be addressed to the superintendent, Mr. Brown.

The Ottawa Housing Commission, Bank National Bldg., Ottawa, will let the electrical work for 10 residences. Correspondence should be addressed to Mr. E. Wilson at the commission offices.

The Ottawa Electric & Gas Co. is reported to be prepared to negotiate for the sale of its system to the city. In 1918 the company refused to have a valuation made by the Hydro-electric commission, but arranged to have a valuation made by recognized appraisors. This has been completed, and it is on this report that Col. D. R. Street on behalf of the company offers to negotiate with the city authorities.

Mr. W. T. Joy, 86 High Park Ave., Toronto, has been awarded the contract for a new $50,000 restaurant on Rideau St., Ottawa. He will sub-let the electrical work.

Pictou, N. S.

The Municipality of Pictou County are in the market for electric fittings to complete new asylum buildings by July 1st. Address Drawer 667, Pictou.

Point Grey, B. C.

The B. C. Electric Rly. Co., Carrall St., Vancouver, B. C., will erect a new station at Marpole, Point Grey, B. C.

Quebec, P Q.

As a result of the refusal of the municipalities of St. Romuald and St. Joseph de Levis to agree to an increase in the fares of the Levis County Railway, the company recently suspended electric street car service, to and from their municipalities.

Regina, Sask.

The total output of electrical energy from the city power house during the month of April was 1,145,000 kilowatts, an increase of approximately ten per cent. over the figure for the corresponding month of last year.

The special committee appointed by the Regina City Council to consider the adoption of the one man pay-as-you-enter street car system, have decided unanimously in its favor.

If the program of the Saskatchewan department of telephones is carried out, approximately 700 miles of telephone lines will be added this year in the province. This will involve the use of some 28,000 poles and about 12,000 miles of wire. Some of the new lines likely to be constructed, it is stated, are as follows:

Saskatoon-Young-Prince Albert; Melfort-St. Brieux; Kerrobert-Loverna; Regina-Weyburn; Unity-Macklin; Rouleau-Ogema; Kerrobert-Tramping Lake; Indian Head-Wapella; Regina-Montmartre-Wawota; East End-Robsart; Preeceville-Canora Expanse-Spring Valley; Gledden-Cornfield; Prince Albert-Shellbrook; Floral Corner-Saskatoon; Delisle-Saskatoon.

The provincial government of Saskatchewan will erect a new powerhouse at the parliament buildings, Regina, Sask. Space is to be provided for 6 generating units.

Renfrew, Ont.

The electrical work will be let on the new Sunday School of the Methodist Church, Renfrew, Ont. Address correspondence to J. K. Rochester, Renfrew, Ont.

St. John, N. B.

Messrs. Jones Bros., 124 Germain St., St. John, N. B., have been awarded the contract for the electrical work on the Union St. branch of the Bank of Montreal, St. John, N. B.

Strathroy, Ont.

The Strathroy Housing Co. are planning to remodel the old American House, at Strathroy, Ont., and make it into a modern apartment. They want prices for the electrical work.

Toronto, Ont.

Legislation to prevent any power company from using more than its rightful quantity of water for the development of power at Niagara Falls has recently been introduced into the Ontario Legislature.

Messrs. Harris & Marson, 81a Parkway Ave., Toronto, Ont., have been awarded the contract for the electrical work on the addition to the Silverthorne school at Mt. Dennis, Ont.

The General Building Corp., 606 Kent Bldg., Toronto, have awarded the contract for electric wiring of their new warehouse, 370-8 Adelaide St. W., Toronto, to the Canada Elec. Co., 175 King St. E. of that city.

The Ontario Hydro-electric Commission contemplate the following development work, according to the supplementary estimates recently submitted: Niagara system $1,250,000; Severn system $50,000; Eugenia & Saugeen systems $475,000; Muskoka system $40,000; Port Arthur & Thunder Bay, or Superior systems $2,500,000; Wasdell system $90,000; St. Lawrence system $500,000; Rideau system $250,000; Miscellaneous $500,000 Queenston-Chippewa Development $10,500,000; Central Ontario system $750,000; Nipissing system $175,000. Total $17,080,000.

Messrs. Cope & Son have taken out a permit at the city hall for the construction of a factory building on Front street, to cost $6,000. They will manufacture electrical fixtures.

The Canadian Tungsten Lamp Company was recently awarded judgment for $5,535 against the Higrade Machine and Equipment Company for the failure to deliver machines according to contract.

Three Rivers, Que.

The Shawinigan Water & Power Co. Ltd., Shawinigan Falls, Que., are erecting a new transmission house on Isle Wayagamack, Que.

Unity, Sask.

The contract for Unity's new power house has been let to G. Janowsky

Vancouver, B. C.

Additions are being made to the Cordova St. branch of the Bank of Montreal, at Vancouver, B. C. The electric wiring will be let

Walkerville, Ont.

Messrs. Harris & Marson, 81a Parkway Ave., Toronto, have been awarded the contract for electrical work on the new branch of the Bank of Montreal, Ottawa St., Walkerville, Ont.

Winnipeg, Man.

The Winnipeg Electric Railway want prices for full electrical equipment for their new Sherbrooke St. sub-station.

An electric fan and ventilating system is required by the Winnipeg Hebrew Free School. Chairman of Building Commission, Mr. S. M. Green, 306 Electric Railway Chambers, Winnipeg.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

THE PUBLISHING HOUSE of MACLEAN
MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 296 Broadway
CHICAGO - - Room 803, 63 E. Adams St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, June 15 1920 No. 12

The Normal Business Cycle—What Stage Are We At?

The "Commerce Monthly," published by the National Bank of Commerce in New York, contains a most interesting and altogether reasonable—as well as timely—article under the heading "The Normal Business Cycle." There is no special reference to the present time, nor is any opinion expressed as to what period in the cycle we may now have reached. It is rather an analysis of the underlying causes of periodic prosperity and depression, and as such is of very real value in assisting every business man to reach his own conclusions. With this in view we reproduce the article in part, elsewhere in this issue.

The business cycle, as outlined in this article, is devoid of the old-time panic which, it is argued, experience should have taught us how to avoid. A typical cycle consists of (a) depression, 10 months (b) revival, 10 months (c) prosperity, 10 months (d) financial strain (liquidation of securities), 10 months and (e) crisis, 2 months. It is claimed that with better understanding of the business cycle the period of prosperity can be lengthened and the period of depression shortened—in effect the curve becomes more nearly a straight line—and the crisis which brings every prosperity period to a close can ultimately be reduced to a relatively painless process of readjustments. The article says in conclusion: "The most important proposal that has yet been made for the mitigation of the extremes of the business cycle is that the various grades of government—federal, state and municipal—together with large corporations like the railroads, should adopt a buying policy designed to throw as many of their purchases as possible into the period of depression and to withdraw from the market in considerable measure at the height of the period of prosperity."

It is perhaps worthy of some attention that the two last most serious depressions occurred in 1893 and 1907—at intervals of 14 years. If this may be considered as establishing the duration of the cycle then we may look for a recurrence of those conditions in 1921.

June the Month of Canadian Electrical Conventions

It begins to look as if the Canadian Electrical Industry were trying to wrest from Cupid his hereditary right to claim the month of June as his own particular property in which to bring to a climax the various little schemes he has set going during the other eleven months of the year and that June in future would become known as the month of conventions rather than of weddings. At least, practically all the conventions that can "happen" are being run off this month, this year. There was first the convention of the whole industry in Vancouver, fathered by the Vancouver Association of Contractors and Dealers, and which was one of the most successful events electrical Western Canada has seen. Next, the municipal engineers of the Province of Ontario met in Niagara Falls on June 10 and 11, and now the usual annual event which has been happening for the past thirty years, the convention of private company officials and associates who comprise the Canadian Electrical Association is set for June 16, 17 and 18, at the Ritz-Carlton Montreal.

The day is coming—let us hope it may not be too tardy—when all these various factors will realize that it is in the interests of the whole industry that they meet together and discuss convention problems. There is room—more than that, there is urgent need—for an organization that will include representatives, at least, of the manufacturers, wholesalers, contractors, dealers, operators and engineers, so as to ensure all of the various elements working in harmony. Of course there are many items which may not be of common interest, but there are also many problems that are of almost equal interest to all of them. They are all interested, for example, in the rapid development of the industry, because the success of each is dependent, in part at least, on the success of all. As separate units it is scarcely possible that the progress should be at the maximum rate—because, often quite unintentionally, there is a failure to co-ordinate the work of the various sections.

This in an age of "getting together." No one can doubt that each association is doing a useful work for its members and a useful work for the whole industry. Can anyone doubt, however, that the sum total of progress could be much greater if these associations, up to a certain point, should sink their individuality in one big representative association whose only object would be "the greatest good to the industry in Canada."

The Administrative Commission of Montreal has closed a contract with the Montreal Light, Heat and Power, Consolidated, for a minimum supply of 1,000 h.p. in connection with the new low level pumping plant for the water works which is being installed and for the filtration plant. The price is $25 per h.p. per annum for primary and $23.50 per h.p. per annum for secondary power. The primary power is to be available for 24 hours and the secondary power 21 hours per day. The contract is for 25 years.

The Normal Business Cycle—Consists of (a) Depression; (b) Revival; (c) Prosperity; (d) Financial Strain and Liquidation of Securities; (e) Brief Crisis and Liquidation of Commodities—Where are we "at" To-day?

The normal business cycle, as it occurs in the absence of special disturbing factors like a great war, has been carefully worked out by a number of recent writers.* The description may start at any place in the business cycle, and the analysis will work around again through the cycle to the starting point. It is convenient to start with the close of the period of depression.

At the end of a period of depression we find the following situation: (1) prices are low; (2) there have been drastic reductions in costs; (3) the margins of profits are narrow; (4) bank reserves are high; (5) conservative policies obtain as to borrowing, capitalization and loans; (6) stocks of goods on hand are moderate; (7) buying is cautious. In such a situation an expansion in the physical volume of production and sales takes place, often with prices still falling. During the period of depression which is coming to a close, people have used up their stocks of clothing and shoes, have reduced the volume of household furnishings, linen, china and the like, factories have allowed equipment and stocks of raw materials to get as low as seems wise, and new buying is forced upon everyone who is in a position to undertake it. Moreover, a growing volume of conservative business men and investors who had "sold out" on the crest of the preceding wave of prosperity, have reached the conclusion that things have about reached bottom and are disposed to invest or to start business again. There comes then a slow and cautious revival and expansion in the physical volume of trade. Slow at first, this process is cumulative, and it gradually turns slow business into active business. The revival may start in a narrow field, because necessarily it spreads to other fields, because the active concerns will have more spending power, which leads them to increase their buying from other enterprises. The active concerns, moreover, employ more labor, which increases the spending power of laborers and increases the demand for many things. Increased retail demand leads to increased demand on jobbers and wholesalers, who pass it on to manufacturers, who take on more laborers, who increase their retail buying. The quickening of industries reacts on the starting point, which in turn is quickened and gives renewed impetus to other fields.

There comes, moreover, a psychological change. The "temper of business" is not a thing which is made by men as separate individuals. Rather, it is a social product. The man who finds business in his own line expanding becomes an optimist with regard to business at large. He talks with other men. They, even though they have not felt increased orders for their own goods, begin to be influenced by his optimism. The process is partly rational and partly non-rational. The mere fact that men find their neighbors more cheerful influences them unconsciously even in the face of facts. On the other hand, the man who has been delaying an increase in his own business activity may well find a valid ground for taking positive action if he finds increasing confidence among those about him. The temper of business, an intangible and psychological thing, is, none the less, one of the most fundamental realities with which business men must reckon. No business man can run counter to a general feeling of despondency, even though he be sure that it is ill-grounded, without incurring risk of loss. On the other hand, a business man may well find it worth while to "swim with the tide" of business optimism for a short time at least, even though he be sure that it is ill-grounded. There are, in the business world, a few strong figures who can stand out against the prevalent optimism or pessimism, little influenced by it, and profit by running counter to it,

---

[illegible] of California Press, in 1913, contains a wealth of statistical materials, by which the theory of the matter is carefully checked.

but to do so requires a long purse, a clear head and unusual courage.

The price level is often slowly falling when the revival begins, but the expansion of trade stops this. For when business men have plenty of orders they stand out for higher prices. Moreover, when prices start to rise, the expectation of higher prices makes buyers increasingly eager. The rise of prices, like the volume of trade, spreads rapidly through all fields. The advance in prices in one establishment puts pressure on someone else to recoup himself.

The rise of prices is uneven. Retail prices lag behind wholesale prices. Consumers' goods lag behind producers' goods. Finished products lag behind raw materials. Retail prices are influenced a good deal by custom. Moreover, the retailer's total costs do not increase as fast as the wholesale prices he has to pay. His overhead charges do not increase as fast as wholesale prices do, and even if he adds all the increases of the wholesale prices to the retail prices, the percentage increase in retail prices is not so great as the percentage increase in wholesale prices.

Unspecialized raw materials, like pig iron, tend to rise faster than finished products, like knives, because they respond more quickly to demand from many quarters, increasing demand not only for knives but also for steel rails, for wire fencing, for tin plate and for many other things.

Wages often rise more promptly than wholesale prices, but in general the increase is much less. Wages are much more influenced by custom than are wholesale prices. Discount rates rise sometimes faster and sometimes more slowly than wholesale prices. Interest rates on long time loans move slowly in the early stage of the revival. The prices of stocks, especially common stocks, advance before the rise in wholesale prices, and go much higher than wholesale prices.

The unequal rise in prices in the great majority of cases means a great increase in profits in the revival period, since most of the elements of cost rise more slowly than wholesale prices. Raw materials, and sometimes bank rates, rise faster than finished goods, but wages lag behind, while supplementary costs or overhead charges are commonly fixed by old agreements covering rentals on leases, salaries and interest on bonds.

The increase of profits and the prevalence of optimism leads to a great increase in investment. This means more orders and higher prices for structural steel, other building materials, machinery, etc.

These factors are cumulative. The rise in prices at one point, increasing the incomes of those engaged in a given industry, increases their ability to buy, which stimulates others, and so on.

Why should not this process continue indefinitely? What is there to bring prosperity to a close The answer is to be found in several factors.

For one thing business mistakes are made. Heavy investments are made in enterprises which either fail to return profits or else fail to return them on the scale expected. The crisis of 1873, for example, grew largely out of an overbuilding of transcontinental railroads, which ran so far in advance of the development of population that they were unable even to earn interest on their bonds. In some measure, overextensions in particular lines, with the result that profits fail to materialize, and even fixed charges fail to be earned, occur in every period of prosperity. Business optimism tends to run beyond reasonable limits. Speculative imaginings take the place of careful calculation.

In the second place, even though business plans be soundly laid at the beginning of a period of prosperity, taking into account the prices and costs that prevail at that time, the very prosperity itself may so alter the data on which the plans were made as to construction and other costs, as to upset the plans, and make it necessary for the enterprise to call a halt, take stock and readjust. Finally, throughout the business field, as the period of prosperity goes on, there is a tendency for costs generally to rise at a very rapid rate.

During the early part of the prosperity period, supplementary costs, or overhead charges, tend to decline per unit of output until existing plants are fully employed. When, however, production necessitates an increase in plant, the overhead charges increase more rapidly than the output. Leases and other contracts expire, moreover, and have to be renewed at much higher rentals. Bond issues at low rates of interest mature and, especially toward the end of the prosperity period, renewals can be made only at much higher rates. So strikingly true is this that it regularly happens that strong corporations, toward the end of a boom, will defer the refunding of maturities and issue short-term notes, expecting after a year or two to be able to refund them into long-time issues at lower rates. The pressure on the capital market grows more and more intense as property increases. Prosperity breeds extravagant consumption, and extravagant consumers save less for investment. Even those who regularly save for investment find it increasingly difficult to do so as the cost of living rises. The end of a period of prosperity is almost always characterized by high interest rates on investments and by a great scarcity of new money for long-time investment.

Short-term money rates and the rates on commercial paper rise, making it more expensive for the wholesaler to carry his inventories or for the manufacturer to carry his materials and work in process.

Other costs increase rapidly. Old plants and ill-located plants are brought into use as the better plants, which alone were worked in the period of depression, are fully utilized. The output of these old and ill-located plants is turned out at a higher cost. Labor cost rises perhaps most of all. This is not due only to the increase of wages. It is due partly to overtime work for which higher rates are paid. It is due partly to the weariness of the laborer, which overtime work involves. Laborers cannot engage in overtime work week after week and month after month without reducing their efficiency. Employers, seeking to enlarge their labor force, moreover, are obliged to take on undesirable individuals who would not be employed in a depression period. Perhaps most important of all, shop discipline is lessened in a prosperity period. Laborers who are sure that they can get a job for the asking across the street cannot be held to their tasks in a period of prosperity as they can in a period of depression. On this point both laborers and manufacturers seem agreed. Laborers complain of "speeding up" in a time of depression, and manufacturers complain of "loafing on the job" in a period of prosperity.

Managerial efficiency is lessened as the pressure of prosperity increases. Managers cannot watch the business so closely. Small wastes multiply, rush orders make for confusion. The pressure, moreover, which working on small margins involves, is removed.

The very prosperity of most businesses imposes serious burdens on those businesses which are least able to raise their prices or to increase their markets. Where prices are fixed by law or by public commissions, as in the case of municipal utilities or railways, a prolonged period of prosperity is apt to increase costs seriously at the expense of profits. Businesses tied up with long-time contracts are similarly placed. Moreover, there are always lines in which recent construction has grown faster than the market. Maladjustments increase. High rates of interest not only check current demand for goods of various kinds but also make it difficult for speculators to hold them off the market.

Consequently at the height of a period of prosperity, an important minority faces declining and vanishing profits. The decline of profits means the doubtful solvency of many outstanding credits. In such a situation it is only a question of time until a readjustment and liquidation is forced. Creditors begin to get nervous. The very rise in interest rates tends to reduce the values of investment securities which have been used as the basis of collateral loans—a phenomenon well known in the bond market. The basis of all credit is, in last analysis, earning power, and with the actual or prospective decline in the profits of a business, its creditors, whether banks or other businesses, tend to demand additional security or to insist on contraction of credit. When profits get shaky, creditors get nervous and force liquidation. A crisis comes. The liquidation extends over the whole field. If a debtor is pressed he is obliged to press his own debtors. The pressure may take the form of offering extra inducements for prompt settlement, as where a seller offers a buyer more than the customary 2 per cent. discount for cash. It may take many forms. If one man succeeds in meeting the pressure upon himself he does so at the expense of others who are embarrassed by it. A sudden change takes place in the temper of business. For many business men the question of profit-making gives place to the question of maintaining solvency. Business men quit pushing sales vigorously, especially when doubtful of the credit of buyers. There comes a rapid falling off of the volume of business. Even when few failures occur the temper of business changes. Pessimism replaces optimism—sometimes almost overnight.

If banks fail to pay their depositors on demand and if they contract loans (or fail to expand loans) a panic comes. This has happened in America a number of times, notably in 1893 and 1907. It did not happen in England, Germany and France in those years because of the better organization of the banking systems. There is little chance of panic when depositors can get their money on demand and when solvent business men can borrow the amounts necessary to meet their pressing obligations.

If a panic comes, a great many plants are temporarily shut down. With the passing of the panic these are reopened and there comes a short-lived revival immediately after the panic. This short-lived revival is chiefly for the purpose of finishing orders not wholly completed, for delivery to solvent firms who do not desire to buy the goods but who are obliged, under their contracts, to take them. New orders do not follow, however, and a period of real depression follows. In this period, consumers' demand falls off as labor is discharged and as profits fail to appear. Investors' demand for construction falls off most of all. These tendencies are cumulative just as the reverse tendencies in the period of prosperity were cumulative. The falling off of orders in one business reacts on the other businesses which sell to it. Prices fall. Wholesale prices fall faster than retail prices. Raw materials fall faster than finished products. Wages do not fall so fast, but they fall. Common stocks fall faster and farther than anything else. High-grade bonds, on the other hand, tend to rise as investors turn to the safest forms of investment, and as the pressure on the capital market is relaxed.

The depression lasts until liquidation is completed. Inefficient firms are weeded out. Costs go down. A reorganization of leases and of bond issues brings rentals and other fixed charges down. Interest falls. Bank rates get low. Bank reserves increase. Labor costs go down. This is partly because wages go down, partly because overtime work ceases, partly because shop discipline improves, partly because the least efficient laborers are unemployed.

We are thus brought back to the point at which we started, the point at which a revival is due. As the depression period continues, clothing, materials, structures, machinery, etc., wear out. Population continues to grow; bargain sales of the equipment of defunct enterprises cease, and new things finally have to be bought. The men who have been waiting for "bottom" to be reached, decide that the time for action has come. At low prices business begins to increase, and the cycle of prosperity, crisis and depression starts again.

Ontario's Municipal Electrical Engineers in Convention at Niagara Falls

Papers and Committee Reports Presented and Discussed—Standard Plug Approved—Service Charge to Range Customer Fixed at 90 Cents.

The Association of Municipal Electrical Utilities held their regular summer convention at Niagara Falls, according to the announced schedule on June 10 and 11. There is no more delightful spot in Canada for a convention and this year was no exception to the rule, as the park and the general scenery on both sides of the river are at their best in June.

The attendance was very large, practically every municipal engineer taking advantage of the opportunity of meeting his fellow members and discussing with them some of his problems. After registration, the first session was held in the afternoon of Wednesday. Professor M. A. MacKenzie, of the Mathematical Department of the University of Toronto, delivered an address on "Sick Benefits and Pension Systems." Professor MacKenzie's article is reproduced elsewhere and a discussion which followed will be noted at length in our next issue.

The official luncheon was held on the same evening About 200 were present with the president, Mr. Oswald F. Scott, in the chair.

Following a few brief remarks by Mr. K. A. McIntyre, president of the Ontario Contractors' Association, Major W. W. Pope, secretary of the Hydro-electric Power Commission of Ontario, delighted the delegates for an hour with pleasant reminiscences of the electrical industry as they had come under the major's notice through his life-long connection with electrical matters. Major Pope outlined the advantages of living in the present time, as compared with the earlier days when there were no railroads, telegraphs, telephones, motor cars, electric lights and, above all, electrical appliances, which so much reduce the drudgery of life and add to its enjoyment. He outlined the work of Sir Adam Beck and spoke of the difficulties that he had encountered and overcome. The Chippawa Canal scheme would be the crowning event for Ontario of a movement which had placed the province in a unique position as regards the universal utilization of electric power in every phase of our industrial, social and private life.

Mr. Dore' of Hamilton, who has been described as the Harry Lauder of Canada, very capably entertained the delegates at intervals with his musical sketches. The supper broke up at an early hour to allow the members to further renew acquaintanceship.

On Friday morning, Mr. G. J. Mickler read his paper on "Merchandising Accounting for Hydro Municipalities" Mr. Mickler is assistant auditor of municipal accounts for the Hydro-electric Power Commission of Ontario and demonstrated throughout a thorough grasp of the subject under discussion. His paper will be reproduced in full in our next issue.

Mr. Hillman, of the Toronto Hydro electric system, opened the discussion and interesting contributions were also made by Messrs. Blay, of London; Taylor, of Hanover; Stewart, of Toronto; Clarke, of Kitchener; Garrett, of Sarnia; Scherer, of Smiths Falls; Hicks, of Oshawa; and Jackson, of Chatham. This discussion will be published in some detail in our next issue.

The final session of the convention was held on Friday afternoon when Mr. P. M. Lincoln presented his paper on "Metering the Consumer's Load." Mr. Lincoln was introduced by President Scott as one of the best known electrical engineers on the continent, having been past president of the American Institute of Electrical Engineers and prominently identified with electric progress for more than a quarter of a century. Mr. Lincoln's opening remark was a reference to his association, beginning just 25 years ago, with the Niagara Power Company, when that company commenced operations, and he expressed the pleasure he felt at visiting the old haunts again, as well as meeting many old friends, and noting the tremendous progress the years had brought forth.

Continuing, Mr. Lincoln outlined the various types of demand watt meters that are in use today, particularly emphasizing the fact that the heating effect of a given load and a given period should be taken as the basis of maximum demand measurement.

Messrs. P. A. Borden, of the Hydro-electric Power Commission, R. G. Lee and others made interesting contributions to the discussion.

A number of committee reports were presented, which space does not allow the reproduction of in our present issue, but they will appear later. These included reports by Mr. Hicks, of Oshawa; Mr. Perry, of Windsor; Mr. McHenry, of Walkerville, and one or two others. One of the most important reports had reference to the utilization of a standard or interchangeable appliance plug and the association went on record as approving the scheme which has already made possible the interchange of plugs among a number of manufacturers. It is not at all likely that any manufacturer will confine himself to this standard plug alone, but it is now possible to install a receptacle in a house, knowing that any one of a half a dozen or so plugs, manufactured by different firms, can be used equally well in this particular receptacle.

A resolution was also passed recommending that the service charge for all electric range customers be fixed at 90 cents.

Manufacturers' Display

In the basement of the Hotel Clifton, a number of manufacturers of electrical equipment had taken the opportunity of displaying their products, so that the convention members may have an opportunity of studying their merits. Among the exhibitors were the Hoover Suction Sweeper Co., of Hamilton; the Majestic Electric Company, Toronto; the Westinghouse Electric Company; Walker Dish Washer Company; Moffatt Stove Company; an exhibit of Peirce brackets by Slater & Barnard, of Hamilton; the Canadian Porcelain Company; the National Engineering Company, and the Lincoln Meter Company of Canada. The Thor, the Kribs and the Locomotive washing machines were also on exhibit, as was also the "1900" washer. There was also a display of Sangamo meters. The Northern Electric Company, the Chas. A. Branston Company and the National Electric also had attractive displays. Souvenirs were given by a number of the companies, including Slater & Barnard and the Hoover Suction Sweeper Company.

Metering the Customer's Load

By Mr. Paul M. Lincoln*

It is a trite saying that the luxuries of yesterday become the necessities of to-day. This saying is true of nothing more thoroughly than of electric service. The first commercial use for electricity was for arc lighting and the first commercial arc lamp was put into operation less than 45 years ago; the incandescent lamp is scarcely 40 years old. While electric power service was used to a limited extent during the late eighties and early nineties of last century, such service in the modern sense may truly be said to have begun with the inception of the Niagara Falls Power Company which began commercial operation during the summer of 1895, or less than 25 years ago. Within my own lifetime, therefore—in fact, within a space of time but little longer than my professional career—electric service has become transmuted from a luxury into a necessity. Power is as essential to modern industry as is blood to a man, and the electrical method of generating, transmitting and distributing such power has so many advantages over other methods that it is fast superseding all other methods; in fact, industry has come to be so dependent on electric power that it would become well nigh helpless without it.

Further, the business of furnishing power to our modern industries has come to be recognized as one distinct and apart from the industry itself. Power can be more cheaply and efficiently generated, transmitted and distributed in large quantities than in small. Hence, few modern industries can afford to manufacture their own power when central station power is available. As a result, the tendency in the past has been, and undoubtedly will continue to be, toward the elimination of the isolated plant and the extension of central station service. In my own mind there is no doubt but that this is logical and is justified by the fundamental consideration noted above, viz.: that power can be generated, transmitted and distributed more economically in large volume than in small.

The specialization of the business of generating, transmitting and distributing electric service brings with it, of course, the problem of rates for the sale of such service and this in turn entails the problem that I have made the subject of this paper, "Metering the Consumer's Load." It might be well first to review briefly the question of rates for electric service from a historical viewpoint.

Rate Problems

The first commercial use of electric service was for arc lamps and these have almost invariably been restricted to street illumination. From the beginning, when arc lighting service has been rendered, it has been customary to base the rate upon the lamp-year as a unit. This basis has proved entirely satisfactory for this specific kind of service; incidentally also, the rate usually includes the upkeep of the lamps and other equipment necessary to render the service. In this case, it is not electric service that is bought and sold so much as it is a certain unit of light and usually for a certain specific duty. When bought and sold on a basis of light, rates for the electric service used in arc lighting becomes a relatively simple matter, and if all electric service were restricted to arc lighting, there would be no "rate problem." With the introduction of the incandescent lamp during the early eighties of last century, the problem of rates for electric service became somewhat more complex. At first, the methods of selling service for incandescent lamps were the same as for arc lamps, that is the so called "flat rate" or a certain fixed amount for each lamp per month. Soon, however, it was recognized that it was illogical not to consider the length of time during which the lamps were burned and the first electric meters were introduced.

The first meters used were on direct-current circuits and depended on the amount of metal deposited by the electrolytic action of the load current; these were, therefore, ampere-hour meters and the design and construction of the first of these was due to Thomas A. Edison. This type of meter was objectionable from a number of standpoints and did not last long after Elihu Thomson brought out the watt-hour meter that bears his name. With the advent of the alternating-current, Schallenberger accomplished for that system what Thomson had already done for the direct-current system and service from both systems was sold thereafter on a watt-hour basis. The use of the watt-hour or kilowatt-hour basis for selling electric service was a vast improvement over the flat rate method that had been used previously and if electric service had always been restricted to lighting there would be no particular need for any measurements other than the kilowatt-hours. Early in the nineties of last century, however, the use of electric service for purposes other than lighting began to be recognized as increasingly important; electric service for power, electrolytic reduction and furnace work began to overshadow the electric light. At this period, began the era of the motor-driven factory, the electrolytic reduction of aluminum, the electrolytic purification of copper and the manufacture of carborundum and calcium carbide in the electric furnace. The use of electricity began to become more general than before; it was no longer simply a source of light as it was at the beginning, but a general service available for almost any purpose at any time. Then it began to be recognized that measurement of kilowatt-hours alone was not enough to give a logical basis for the fixing of rates for electric service. It began to be recognized that load factor as well as kilowatt-hours of consumption must be taken into account in arriving at an adequate rate for such service.

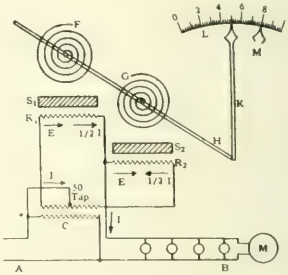


Fig. 1

Load Factor Important

Fixing a rate for electric service that is based on simply the kilowatt-hours of consumption is closely analogous to the problem of fixing the rental of a house or an office based on simply the "man-hours of occupancy," if we may be allowed to coin such an expression. A perfectly just and logical basis for the amount of rent to be paid can be arrived at if we know the "man-hours of occupancy," provided we also have reasonably accurate information concerning the habits of the occupants. So also, a perfectly just and logical basis for the rates for electric service can be arrived at from the kilowatt-hours of consumption alone, provided we know the load factor (habits) of the load taken. However, if the occupants of our house or office begin to spend a larger part of each day indoors, it is evident that our former basis of rental becomes illogical. So also with the user of electric service; if he should begin to use his service for more hours per day, the rate that was established formerly would no longer remain logical. In other words, load factor must be taken into account if we would have a just and logical rate.

---

*Lincoln Electric Co., Cleveland, Ohio.

However, justice and logic are not the only criteria by which to judge a rate. The question of the cost of obtaining the information upon which the rate is based is one of the utmost importance. Even under present conditions the cost of securing and handling the information necessary for billing purposes constitutes a very considerable part of the total cost of rendering electric service, particularly to residential consumers. Therefore, any plan that causes a very material increase in this cost, even though it makes for a more logical and more just rate, cannot be tolerated.

More than thirty years ago, or, to be more specific, in the year 1883, Dr. John Hopkinson of England first suggested the use of "maximum demand" as an item of first importance in the schedules of rates for such a service. In his presidential address before the Junior Engineering Society (British) on November 4, 1892, on the "Cost of Electric Supply," he elaborated his ideas on this subject. So clearly did he show therein that the maximum demand, in addition to the number of "units' (kilowatt-hours) used is absolutely essential in arriving at the cost of supplying electric energy, that ever since, any method of fixing rates that involved the use of maximum demand has been known in general as the "Hopkinson method."

Since Hopkinson's first suggestion, there has been much discussion on this question of rates. Papers almost without number have been written on this subject of rates and every phase of the matter has received critical attention. For the past ten years the National Electric Light Association (U. S.) has issued a weekly bulletin entitled Rate Research, and devoted to nothing else but a discussion of rates and closely allied subjects. Without exception, all authorities have recognized the correctness of Hopkinson's main contention, viz., that any logical rate for electric service must, in some manner, recognize maximum demand as well as the total kilowatt hours of energy used. thereby taking load factor into account.

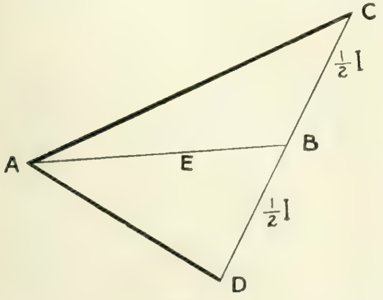


Fig. 2

When we come to consider the question of how this maximum demand of a customer for rate-making purposes shall be obtained, we are at once faced with the fact that in general it is not obtained. When I say it is not obtained, I mean it in a relative sense. The electrical industries of Canada and the United States now absorb watt-hour meters at the rate of well over one million per year. The use of the maximum demand indicators of all types and descriptions probably does not exceed more than a fraction of one per cent. of this number and therefore in only this small fraction of the customers for electric energy is any direct attempt made to apply the Hopkinson method of charge. The watt-hour meter has admittedly reached a stage of development that leaves but little to be desired. The modern watt-hour meter is accurate, cheap and relatively easy to maintain. However, it gives only one of the items of information that enters into a logical system of rates and makes no attempt to furnish any other.

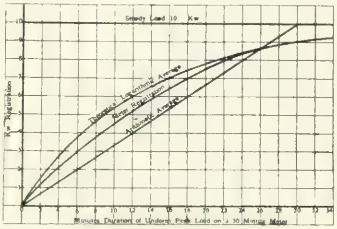


Fig. 3

"Hopkinson method" is a generic and not a specific term. There are many varieties of "Hopkinson methods." The inherent complexity of the rate question together with the long absence of any adequate method of measuring maximum demand has led in many cases to the practice of inferring the maximum demand instead of measuring it. In some cases, for instance, it is the practice to base the maximum demand on the summation of all the name plate ratings of the motors connected. There are many objections to this practice. In the first place, it tends toward the installation of motors too small for their work with consequent motor trouble. Next, it makes for the misbranding of motors in placing name plates on them smaller than their actual capacity. Motor manufacturers are often asked to alter name plates for the purpose of its influence on the prospective customer's power bill. Next, it discourages individual drive for motor driven appliances. Individual drive is coming to be recognized as best practice, and it is unfortunate, to say the least, that we should have another influence running counter.

Next, it is coming to be the practice of guaranteeing no overloads on motors and here again this practice runs counter to that of basing maximum demand on name plate rating. Again, the practice recognizes motors only and in this day of growing popularity of electric furnaces, heating devices and the many methods of using electric service, a method of inferring maximum demand that rests on the name plate rating of the motors is deficient. Then finally, it is not a users potentiality to use power that should fix his maximum demand, but his actual use. Maximum demand should be measured, not inferred.

Wright Demand Meter

The first device that sought to fill the need first pointed out by Hopkinson was the so-called Wright Demand meter. This device was patented by Arthur Wright of England in 1893 and first appeared on the market about 1896 or 1897. This was an ampere demand meter and not a wattmeter; it, therefore, suffered the fatal defect that it recognized amperes of demand instead of watts and therefore penalizes the user of power whenever the voltage is low. The user is not responsible for low voltage and therefore the system of rates based on amperes of demand instead of watts, inflicts a penalty for a condition for which the user is not responsible—a position that is quite untenable for a supplier of power. In addition, the Wright meter as designed and used had no method of compensating for the heat that flowed into or out of the active air chamber due to heat conduction in the lead wires. Judging from the results of tests, this defect alone is apparently sufficient to condemn the device independent of the consideration that it is an ammeter instead of a watt-meter.

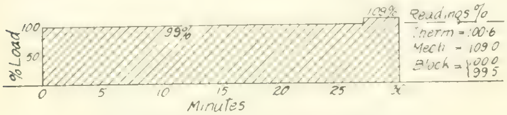


Fig 1—Thirty minutes average 100%

There are three recognized types of demand watt-meters in use to-day. They are:

1st—The Thermal Storage Type.

2nd—The Mechanically Lagged Type.

3rd—The Merz or Block Interval Types.

The characteristics of these types will be described in the order named.

1st.—The Thermal Type

The theory and characteristics of this type are fully given in two papers by the author in the A. I. E. E. proceeding of October 8, 1915, and February 15, 1918. Some of the material from these two papers is quoted in this paper.

Operation

The operation of the thermal watt-meter is shown diagrammatically in Fig. 1, in which A is a single-phase circuit feeding a load B. A small transformer C is incorporated within the meter with its primary across the circuit A. In series with the secondary of this transformer are two equal resistances R_1 and R_2. A current is, of course, set up in these resistances that is proportional to the voltage of the circuit A. The load current is also caused to circulate through these same resistances as shown in Fig. 1, being taken into the middle of the secondary or the small transformers and out at the connection between resistances R_1 and R_2. These two current—one the secondary current, due to the presence of the voltage and the other due to the passage of the load current—are additive in one of these resistances and subtractive in the other, and the difference in the heating effect of the two resultant currents is proportional to the wattage of the load B.

If the current that passes through the resistances R_1 and R_2, due to the presence of the voltage, is represented by E, and the load current therein by I, the resultant current in one of these resistances is $E + \frac{1}{2} I$, and in the other $E - \frac{1}{2} I$. The difference in the losses in R_1 and R_2 is proportional to the product EI.

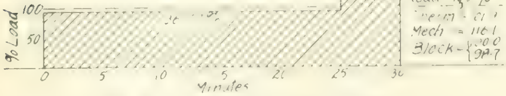


Fig 5—Thirty minutes average 100%

F and G represent two spiral springs made from bimetallic strips, attached rigidly to their casings at the outer ends to a common shaft H at their inner ends. These bimetallic springs tend to uncoil on an increase in temperature (due to the difference in temperature coefficient of the two metals of which they are composed) but, since the two springs are wound in opposite directions, no movement of the shaft H will take place unless there is a difference in temperature between F and G. The shaft H, therfore, will not turn with changes in atmosphere temperature or with any other condition that causes both springs to maintain the same temperature, but will respond only to the difference in temperature caused by the difference in the losses in resistances R_1 and R_2. S_1 and S_2 represent diagrammatically the thermal storage of the cases in which the bi-metallic springs F and G are enclosed. Due to this thermal storage, the watt-meter does not respond instantly to a change in load but always indicates the logarithmic average load over the time period immediately preceding the instant of observation, the length of this time period being determined in part by the amount of thermal storage of the cases. K is a pointer attached to shaft H and travelling over the scale L. M is a friction pointer which shows the highest position of pointer K since last reset.

That the indications of such a device will correspond to the watts independent of power factor is indicated graphically in Fig. 2. Suppose AB, Fig. 2, is the value of the current that flows through the resistances R_1 and R_2 due to the secondary voltage E in the transformer C of Fig. 1. Suppose further that CD, Fig. 2, represents both in magnitude and phase angle the load current I that flows through these same resistances. It is obvious that the resultant current in resistance R_1 is proportional to the distance AC Fig. 2, and that in R_2 is proportional to AD. If AB and CD are in phase the resultant currents are respectively $E + \frac{1}{2} I$ and $E - \frac{1}{2} I$. Since the heating effects are proportional to the squares of these values, the indication on the scale is proportional to $(E + \frac{1}{2} I)^2 - (E - \frac{1}{2} I)^2 = 2\ EI$. If AB and CD are 90 degrees out of phase with each other, it is obvious that the two resultants will always be of the same value. For any other angle, or for any wave shape, it can be proved mathematically* that the watts are proportional to AC^2-AD^2 and this is the value that is measured by the thermal demand meter.

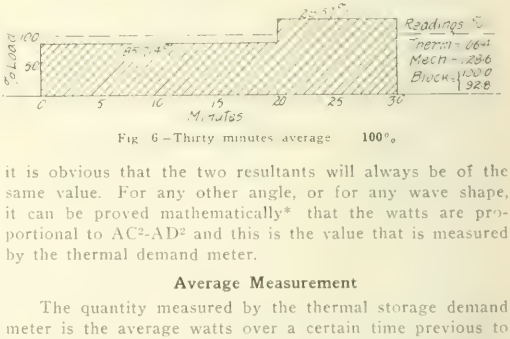


Fig 6—Thirty minutes average 100%

Average Measurement

The quantity measured by the thermal storage demand meter is the average watts over a certain time previous to the instant of observation, rather than the instantaneous watts measured by an ordinary watt-meter. Further, the average so measured is not the arithmetical average, but what is called the "logarithmic" average. In other words, the indication of a thermal storage watt-meter is not that due to the watts passing at that instant, but is the resultant of all the wattage flow that has passed, each instant of past flow having a value influenced in respect to its time proximity by a logarithmic law. When the word average is used in its commonly accepted sense, it is assumed that each instant of time over which the average is taken has equal weight. In the resultant that is obtained by a heat storage meter, each instant of time has not an equal weight, but the influence of each instant decreases with its remoteness in point of time, and the degree by which the watts during any instant influences the total indication is proportional to e^{-kt}, where e is the base of Napierian logarithms, k is an adjustable constant, and t is the time measured backward from the instant of observation. For steady loads, the logarithmic and arithmetical averages are the same. The same is true where the load is fluctuating provided the fluctuations in load are comparatively rapid. For instance, if the load fluctuations are continuous and do not exceed two minutes in duration on a thirty-minute meter, results on the logarithmic and arithmetical average meters are the same. For isolated peaks of load, the logarithmic average meter responds to the increment of load in excess of the previously existing steady load in a manner that will give results close to but not necessarily identical with the arithmetical average. For instance, the arithmetical average or an isolated peak load for a time duration of more than about 26 minutes will be greater than the registration of a 30 minute thermal demand meter, the maximum value of the difference being 10 per cent. of the increment of the peak load over the previously existing steady load, as shown in Fig. 3. For peak load durations less than about 26 minutes the arithmetic average will be less than the logarithmic average registered by the thermal meter, the percentage difference increasing as the duration of peak load decreases, as shown in Fig. 3. For example, if a 10 kw. load is applied to a 30 minute thermal demand meter for five minutes, it will register—providing the previous load has been zero—about 2.64 kw. of demand while the arithmetical average of that same five minute peak over the 30 minute period would be 1.67 kw. If the peak should last for twenty minutes instead of five minutes, the thermal meter would register approximately 7.54 kw. of demand as against 6.67 kw. by the arithmetical meter. As indicated above, at about twenty-six minutes of load duration, the indications of both types of meter would be identical. In brief, for a short time duration of peak load, the arithmetical average is lower than the logarithmic average; for longer periods of time, the arithmetical average is slightly higher than the logar.-ithmic average, while for very long durations, exceeding twice the time period of the meter, there is no appreciable difference. The logarithmic characteristics of the thermal demand meter is of advantage, because such a device recognizes the heating and this is the quantity after all that should be recognized, since it is that which fixes the limiting capacity of the equipment necessary to furnish the service.

---

*Such proof is given in Appendix II of a paper entitled "Rates and Rate Making," Trans. A. I. E. E., Oct. 8, 1915, Vol. XXXIV, p. 2313.

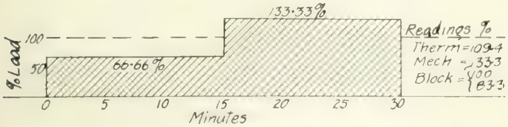


Fig. 7—Thirty minutes average -- 100%

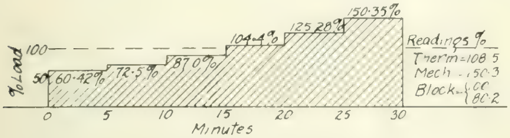


Fig. 8—Thirty minutes average = 100%

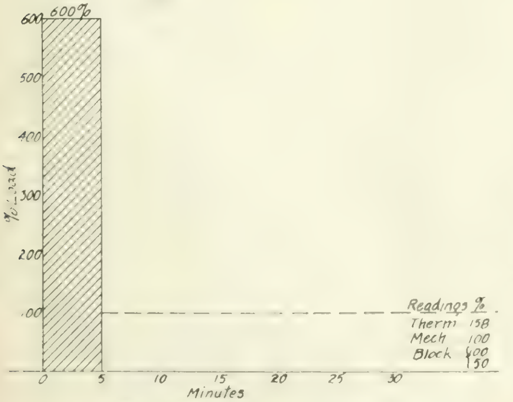


Fig 9—Thirty minutes average 100%

If the character of load is known, the indications of a thermal storage demand meter can be determined by analysis in the manner outlined in the 1918 volume of the A.I.E.E. transactions, pages 162-165. The results of such an analysis on certain specific types of load are given later in this paper.

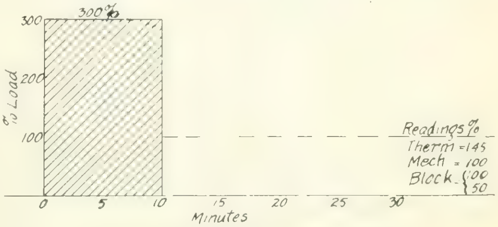


Fig. 10—Thirty minutes average 100%

2nd—The Mechanically Lagged Type

In this type, an indicating watt-meter of any standard type is associated with a standard watt-hour meter in such a way that the indications of the indicating watt-meter are delayed by the action of the watt-hour meter. An escapement is attached to the indicating watt-hour meter so that it cannot advance instantly as in the usual meter but can advance only a certain definite amount for each revolution of the watt-hour meter. A ratchet is provided so that the indicating watt-meter may recede instantly, but the next advance when it occurs is again retarded by the watt hour meter. The characteristics of this meter therefore, are that it will always advance at a rate proportional to the total load passing while it recedes instantly. The characteristic of advancing at a rate proportional to the total load instead of the increment of load causes this meter to read high whenever short time increments load are superimposed on a previously existing steady load and the characteristic of receding instantly causes it to read low whenever the load is such that it returns to zero or some other low value. The Westinghouse type "RO" demand meter is the only one of this type that has been manufactured to date.

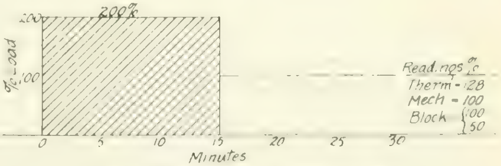


Fig 11—Thirty minutes average 100%

If the character of the load is known, the indications of this type of meter can also be determined by analysis. The

Results of such an analysis on different specific types of load are given later in this paper.

3rd—The Merz or Block Interval Type

In this type of demand meter a standard watt-hour meter is associated with a clock or other timing device in such a way that the number of revolutions of the watt-hour meter disc during some definite interval of time are determined by the device; at stated intervals a definite and fixed time apart from the clock or other timing device sets a register back to zero. The watt-hour meter then advances this register during the ensuing time interval. At the end of the interval the clock or other timing device again resets the register to zero and the process of advancing begins again. A maximum register indicates at the end of the month the maximum advance that has taken place during the month or since last reset. The inherent defect in this type is that it may "split" the peak when the time duration of the peak is less than the time interval of the meter. The Merz or block interval type of demand meter therefore, measures the arithmetical average of the watts over a definite time interval, but the maximum time interval so measured might not correspond with the actual maximum. It, however, has the vital advantage that its indications are "safe." If any device used in determining a customer's bill favors the company supplying the service, it can be successfully attacked by the customer while, if the contrary is true, it cannot. Hence, the indications of this type of demand meter are "safe" since it cannot over register. Another disadvantage of the "block interval" demand meter is that two or more of them applied to the same load will rarely check each other. This characteristic follows from the fact that it is impossible to synchronize the clocks or other timing devices used with these meters and therefore, the time intervals of the various meters do not correspond. The actual peak may be split in various ways by the various meters used and hence the readings will not correspond.

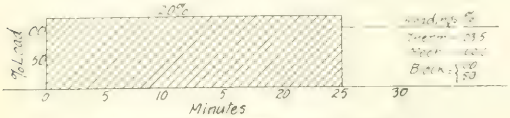


Fig 12—Thirty minutes average 100%

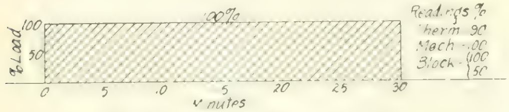


Fig 13—Thirty minutes average 100%

Types of Load

The best method of visualizing just what these various types of meters will indicate is to show by analysis what each type will read with a definite and specific character of load applied. In Figures 4 to 16 inclusive, this is done for thirteen definite types of load. The number of possible types of load is of course infinite and it is impossible to consider them all. However, the types considered in Fig. 4 to 16 are more or less typical of actual loads and at least will give a general idea of what each kind of meter will do on a given kind of load.

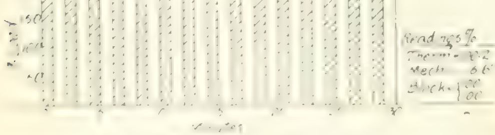


Fig 14—Thirty minutes average 100%

The type of load considered in Figs. 4 to 8 is a continuous steady load with superimposed peaks of certain definite character. All load values are so chosen that the arithmetical average over the maximum thirty minutes is 100 per cent. Thirty minutes has been taken because the results of these particular loads have been carefully checked on a thirty minute thermal meter. The results are relatively the same on a ten minute period as these figures show for a thirty minute. In general, for this type of load, the thermal demand meter reads slightly above the arithmetical average, by an amount depending on the increased heating effect caused by the superimposed peaks; the mechanically lagged shows an excessive over registration; the block interval meter shows the arithmetical average over thirty minutes with a "coefficient of indefiniteness" that increases with the amount of the superimposed peak.

Figs. 9 to 13 show the results of the various types of meters with isolated blocks of load of various times of duration. Here again the arithmetical average of the block is selected so as to be 100 per cent. over a thirty-minute period; the results however, would be relatively the same if any other time periods were considered. In general, for this type of load, the thermal meter reads higher than the arithmetical average—except Fig. 13—and the excess in each case is due to the higher heating effects of short time high peak loads; the mechanically lagged meter reads the exact arithmetical average; the "block interval" meter read the arithmetical average; the "block interval" meter reads the of indefiniteness" of 50 per cent. It will be noted that the excess of the thermal meter over the arithmetical average is very marked when the demand is confined to a short interval. For instance, in Fig. 9 a load of six times normal for one sixth of the normal time period is shown and in this case the thermal meter reads 158 per cent. of the arithmetical average. I consider this a perfectly logical result since the heating effect of a load of six times normal for one-sixth the normal time is much greater than if a normal demand had been spread over the entire thirty minutes. A customer who insists on taking his entire thirty minutes quota of power in five minutes and then takes nothing for the other 25 minutes obviously should be penalized for taking his load in this way. The thermal meter inflicts this penalty automatically; it recognizes the true heating effect of a given load no matter how it is taken.

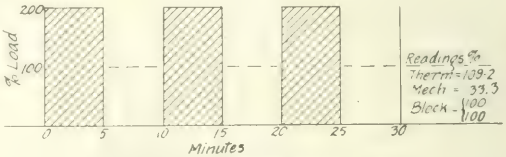


Fig. 15—Thirty minutes average 100%

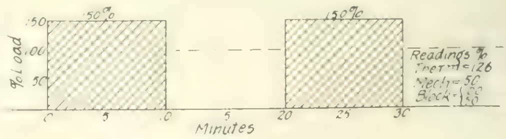


Fig 16—Thirty minutes average 100%

Fig. 14 to 16 show the results on the various types of meters when the load is constantly fluctuating over wide limits. Here again the arithmetical average over the maximum thirty minutes is 100 per cent., but the results would be relatively the same on any other time period. In general, the thermal meter reads slightly above the arithmetical average—the excess being governed by heating effect as in the other types of load; the mechanically lagged meter reads only a fraction of the arithmetical average load; the block interval meter reads the arithmetical average as a maximum and has a "coefficient of indefiniteness" which is considerably affected by the exact character of the load. The low reading of the mechanically lagged meter is due to the characteristic that causes it to follow a receding load instantly.

While many other types of load might be shown, it seems that these thirteen examples will give a sufficient idea of the characteristics of the various types of meters to enable prospective users to judge of their respective merits. Actual tests with meters of various types and on various time periods on loads of various kinds would be highly interesting and it is hoped that such tests can be made.

There is one further point that deserves some discussion before this paper is closed. One can logically take the stand that if the heating effect of a given load over a specified time period is to be taken as the basis of maximum demand measurement, then power factor certainly should be considered also in arriving at the demand. In other words, the demand should be based on kv.a. instead of kw. This I am perfectly willing to admit. The difficulty comes in measuring kv.a. of demand instead of kw. There are methods now in use of measuring kv.a. of demand, but they are very expensive methods and it is only the largest customers that bring in a sufficient revenue to justify the measurement of kv.a. While it is quite possible that the cost of measuring the kv.a. of demand can be brought to a lower figure than at present, it also seems that the measurement of the kv.a. of demand will always be many times more expensive than the measurement of kw. I see no prospect that this situation will ever change. It is therfore, my recommendation that programs for the measurement of demands shall not be held up awaiting the appearance of a device to measure the kv.a. of demand. There is no doubt that such a device is coming and that it will appear shortly; there is also no doubt but that its costs will put it beyond the reach of all but the largest users of service. The ability to measure kw. of demand both accurately and cheaply is now here and this ability should be made use of. We must govern our conduct not by the ideal but by the actual. The ideal is the measurement of demand on a kv.a. basis; the actual is that while this is possible, its cost is so high that it is inapplicable to all except the more important customers.

Sick Benefits and Pension Systems

By Professor M. A. Mackenzie

The attention recently given to Sick Benefit Funds and Pension Systems throughout North America marks an interesting change, full of possibilities, in the development of industrial life. If, during the coming years, many of these funds are carefully watched and protected and the Pension Systems that are being introduced should be laid down upon sound lines and kept upon those lines, there will develop an influence of great value in the improvement of relations between employers and employees because such systems tend to promote steadiness and permanency of employment. If, however, the funds should be indifferently managed or the systems promoted upon unsound lines, they will inevitably lead to discontent and must either collapse or be painfully reconstructed in the face of suspicion and amid charges of bad faith.

After all, these things are not new. We have a long history to guide us. Sick benefit systems existed in the thirteenth century in England and also upon the continent. The Guilds, as they were called, in which such funds developed were generally purely local, sometimes connected with a special branch of industry. They granted benefits in case of sickness, poverty and old age, damage by fire, water or thieves. Some provided relief in case a member was cast into prison and some even provided dowries for daughters. Death benefits were generally provided by a special levy on the survivors. These old Guilds are so interesting that it may be worth while to read an extract from the rules of one of them. The following is taken from the Statutes of the Guild of Smiths in Chesterfield:

"When a brother is ill and needs relief, then he shall receive half a dime daily; when brethren fall into poverty then they shall go singly on certain days to the houses of their brethren where each one shall be received civilly, and he shall obtain whatsoever he may need in the shape of food and clothing, as if he were the master of the house himself, and he shall also receive half a dime like those who are ill, and then he shall go his way in peace." Brotherhood is a real thing.

These Guilds were independent of the masters. They were self-supporting, each member contributing to the common fund. Sometimes the contributions were equal, sometimes they were graduated according to the wealth of the member like a modern income tax. In some trades membership was compulsory upon every employee, in others the voluntary system obtained. Hundreds of these organizations were created during the middle ages, most of them with the best intentions and most of them on impossible lines. Hundreds of them collapsed to be followed by hundreds more, but during the centuries the lessons of sound management were being painfully learned and the underlying principles of all such organizations were becoming apparent. It was only in the latter part of the Nineteenth Century, after the industrial revolution and the growth of large corporations, that the employers took an interest in such funds and began to contribute to them. At present there are many Sick Benefit Funds and Pension Systems in England among the railways, manufacturers, trading companies and other large corporations. There have been similar funds for such relief and for pensions in North America, but the great opportunities offered to new settlers and the enormous natural wealth of this continent left little room or need for the development of such funds. It is only in comparatively recent times that industrial conditions in North America have forced us to attack the problems of incapacity and old age, and being North Americans we know very little of European history. We are convinced that our problems are peculiar to ourselves and we dash at them with energy, courage and ignorance that are all unbounded.

If we look into these problems a little more closely we will find that insurance against sickness is like insurance against fire—a mere contract of indemnity. If a fire occurs, the insured has a claim. If no fire occurs, the insured has no claim. No matter how many years a man may have paid premiums to a fire office he never imagines that he has a claim against that office unless and until a fire occurs. This is analogous to insurance against sickness. No man has any claim upon the sick benefit fund until and unless he is sick. On the other hand insurance against death is not a contract of indemnity at all. It is a guarantee of a definite payment that is certain to be made at some time in the future in consideration of certain definite periodical payments called premiums to be made by the insured in the meantime. Thus the sick claims of each year can properly be met out of the income of that year. No special fund need be built up for each man to provide for the future sicknesses of that man. On the other hand, if a man is insured against death and especially if that insurance be combined with the right to a pension should he survive, a fund should be built up every year out of his premiums so that provision may be made for a claim that is bound to arise. Thus the finances of a sick benefit fund are on an entirely different basis from the funds of a death benefit and pension fund.

Let us deal first with sick benefits.

Now sickness, from our point of view, may be divided into:

Those resulting from injury which arose in the discharge of duty, and

Those which are independent of any such connexion.

The Workmen's Compensation Act has, to a large extent, removed the first from our consideration. It is sickness of the second class which is to be provided for by a sick benefit fund. Now if all men were honest and no men were shirkers, our problem would be easy. It is true that the rates of sickness vary in different occupations and among different classes of men, but each organization would soon find its own requirements and, keeping a margin for contingencies, could strike and maintain a rate appropriate to the benefits. Unfortunately, however, there are a few men in every community who fall below the common standards or honesty and when such men become members of a sick benefit association they try "to beat the system." Safeguards have therefore to be introduced in various ways.

By Medical Examination

This provision is generally regarded as essential, but examination by the applicant's own physician cannot be regarded as satisfactory. The medical profession is neither infallible nor are all its members incorruptible. The selection of the physician is of vital importance and periodical examinations and reports in cases of prolonged sickness are essential.

By Limiting the Time During Which Benefits May be Enjoyed

This safeguard is also generally adopted. A common method is to grant full sick pay for a limited number of weeks of sickness to be followed by decreasing fractions of full sick pay for subsequent periods of continued sickness. Another method is to allow so many days of sick pay each year. When the number of days so allowed is small then there is also sometimes a provision that credits for sick pay may accumulate, so that a man who serves nine years without an illness may have the right to ten times the annual allowance of days of sick pay in his tenth year should he then fall ill.

By Limiting the Age up to Which Members are Entitled to Sick Pay

As men grow older sicknesses become more frequent and tend to become chronic. Nor is it always easy to distinguish between sickness and the infirmity of age. Of course, if the sick benefit is operated in connection with a pension scheme, sickness will not be considered after a pension has been granted, but even if there are no pensions it will be found necessary to fix a limiting age beyond which sick pay may not be claimed.

But the most important safeguards are those that are least recognized and most difficult of adoption. They are, first,

The Placing of Some Part of the Financial Burden Directly Upon the Employees

themselves by means of regular contributions to the fund. When this is done the men have a personal interest in preventing malingering, and human nature is such that many men who would not hesitate to "put one over" on the company would yet scorn to benefit directly at the expense of their fellow employees. Second and most important of all, the best safeguard consists in

Limiting the Sick Pay

to such a fraction of the active pay as will not put a premium upon dishonesty. It is a remarkable fact that sickness rates are generally highest in those associations where sick pay is highest and lowest in those where the sick pay is low.

The practical problem of sick benefits therefore resolves itself into a problem of drafting the regulations so as to reduce dishonesty to a minimum, and carrying out these regulations strictly, without at the same time lowering the benefits too much for the honest man who will always be in the majority and for whose protection the system exists.

Coming now to the much more difficult problem of pensions—pensions upon invalidity, of course, need safeguarding even more carefully than sick benefits, because the cost of such pensions is much greater than the cost of temporary sick pay. All pensions, whether upon invalidity or upon old age, have an appearance of simplicity that is quite deceptive. We hear of the adoption of pension systems by one corporation after another—great, strong corporations that surely must know what they are doing. We write to such corporations and obtain details of their newly adopted plans and from these details we construct a plan for our own corporation. But we do not get particulars from plans that have been half a century or even a quarter of a century in operation. Now the history of nearly all such funds is the same. At the outset the payments to pensioners are a small charge, a very small fraction of the total pay roll, so they are included among the expenses and met as they arise. Each year, however, adds to the pension list, and though some pensioners die, the total number of pensioners continues to grow. Two facts have been overlooked. The men who had been long in the employ of the corporation when the system was started were the survivors of the smaller staff of many years ago when the corporation was young. Also when the system was started no consideration was given to the fact that a number of old servants were still living who had retired without pensions before the system was adopted. Consideration of these facts shows why the pension list will continue to grow year after year until it has reached a very large percentage of the pay roll. In the customs and treasury departments of the British Civil Service the pension payments in 1902 amounted to 30 per cent. of the active pay roll of those departments. That pension plan has been in operation for nearly a century and the staff in those departments had not been an increasing one for many years. No ordinary corporation could stand such charges. When the pension payments have grown to 10 per cent. or 15 per cent. of the pay roll they become a serious drain upon the resources of an ordinary corporation and attempts are made, especially in times of financial pressure to check this drain which shows no signs of checking itself. Such attempts are met by the fact of vested interests. The employees at once advance the plea—you promised us pensions. We remained in the service in full expectation of those pensions. Had we not had that hope we would have left the service and bettered ourselves long ago. Now we are told to move and you propose to break the promise in which we have trusted. The plea is unanswerable. It certainly is not answered by pointing to a clause in the regulations which states that "nothing herein contained shall give any employee a contractual right to a pension." That may be a legal answer, but every employer of labor knows that it is not a practical one. Even if no attempt is made to evade the promised pensions, the employer will find sooner or later that the employees refuse to regard the pensions as benevolent grants for long and faithful service, but will insist upon regarding them as something which the employees have earned and to which they have a right. "Deferred pay" is the expression used and it represents a fixed idea. In a pension system which has been some years in operation the employees will regard their pay as so much cash and so much credit toward a pension. I fancy that if all these things had been forseen most of the pension systems in operation would never have been created.

In January of 1916 the State of Illinois appointed a Commission to investigate pension systems. Three years later the governor of the state in his message to the Illinois General Assembly said: "the commission has found that nearly all, if not all, of the several pension funds created by the different municipalities, as well as by the state itself, are hopelessly insolvent." The same remark could be made regarding many, if not most, of the pension systems in existence in North America. This sounds very dreadful and very pessimistic, but the commission which found this condition has also carefully pointed out the errors and ill-advised beginnings which created it. Moreover, the commission fully realizes the need of pension funds as a necessary part of our social machinery and has elaborated standard plans for sound and satisfactory pension systems. All the evils that have arisen have been due to lack of foresight and unwillingness to learn from the experience of others. The benefits of a pension plan can be secured and the plan made permanently solvent if the initial difficulties are fairly faced and the plan prepared upon actuarial principles.

Let us now consider what are the objects sought by a pension plan and how these objects can best be obtained. First, what are the objects sought by the employer? They are

The Elimination of the Unfit

In most old services there are men who are kept upon the pay roll so long as they can put in an appearance at the office or shop. These men ought to be superannuated. They retard the business and they clog the avenues of promotion, but if thy have no other means of support, it is very difficult for the management to get rid of them. In a government or municipal service they become a very serious menace to efficiency.

The Retention in the Service

of the best men who might otherwise be attracted by higher cash offers elsewhere. The capable man of fifty who knows that he will be able to retire on a pension at sixty-five if he remains in the service will hardly be attracted even by a 20 per cent. increase in salary from some other employer.

The Attraction Into the Service

of a more thoughtful type of man who appreciates the advantages offered by the pension plan.

Next, what are the objects sought by the employers? A little consideration will show that here we have divergent interests. The older employees simply desire a pension toward which they have made and can make no comparable contributions. They are generally not interested in the case of the young man with a growing family who may become disabled or die while the family is young. They have themselves escaped these dangers. They are thinking mainly of their own old age. They base their claim upon long and faithful service—"the heat and burden of the day"—and to them the pension is a benevolent gratuity. On the other hand the younger men in the service and the men who are about to enter the service will not regard the pension plan in this light. They argue that the employee earns all he gets and the system contains for them no element of benevolence. They look upon the benefits not as gifts but as a part of their wages, and they insist that these benefits should be designed to meet these risks of the whole life of service, not merely the risk of poverty in old age. The benefits they desire, therefore, are:—

A Payment on Death

before reaching the pension age.

A Pension on Disability

before reaching the pension age.

Compensation for Loss of Rights

on dismissal or voluntary resignation, and

A Pension on Old Age

not primarily for themselves, they are too young to think of that, but because such pensions will keep open the avenues of promotion.

The future of the corporation lies with its younger men and it is unfortunate that the broader outlook which they possess should be ignored by the employer who usually consults only the older men in the preparation of a pension plan. Generally speaking it may be said that the objects sought by the younger men and by the employer are identical and tend to the permanent improvement of the service.

Now that we have considered the benefits let us see how they are to be provided. These things cost money. How is the money to be raised? The first and most obvious plan that suggests itself is to contribute a percentage of the wages or salary total just sufficient to make the pension payments year by year. In other words, to regard pension payments as being part of the expenses of the year in which they fall to be made. I have already referred to this plan and so far as I know it has never stood the test of time except in the case of the civil servants of a great government—Great Britain for example. Even with great governments the plan has failed. We all know of its failures at Ottawa. It It has also failed in Australia, in New Zealand and at the Cape. It has failed in New York and Chicago with teachers, policemen and firemen. It has failed in similar cases nearer home. Indeed the list of failures is a long one.

What is the alternative It is to regard the benefits of the system as insurance benefits are regarded, to ascertain the proper cost premiums for each age at entry, to collect these cost premiums, to accumulate them as a reserve for the benefit of those on whose behalf they are paid and not to pay any benefit to any man unless the cost premiums for that benefit have been collected in respect of that man.

If from the commencement of a service every man has paid the premium proper to his age at entry, there would be no trouble at all. The troubles arise because when a pension fund is started there are a number of middle-aged and even some old men in the service and no premiums have been collected and accumulated in respect of their previous years of service. If, for example, we have found that a level premium amounting to five per cent of salary as from age at entry into service will provide the benefits, it is obvious that the future five per cents of these older men will not provide the same benefits as the future five per cents of a young man just entering the service. There is an accrued liability in respect of these men and that accrued liability must be ascertained and met as far as possible. If it cannot be met in full, then these older men cannot obtain full benefits. It will not do to pay benefits to older men out of the premiums collected from or in respect of the younger men. That will simply defer and accumulate the deficit and will end later on in disaster.

We must now consider the question of who should pay the premiums. The usual but by no means the invariable practice among modern pension funds is to ask for no contribution from the employees. Some industrial and more municipal corporations, however, demand that the employees pay some part—usually a half—of the premiums. In my opinion it makes very little difference in the long run whether the young employee just entering the service pays a share of the premium or not. The employer who forces his staff to contribute will be himself forced to increase wages above the competitive wages paid by another employer who has an equivalent pension plan for which he makes no deduction from wages. It will probably be found easier to create the plan if the employer nominally assumes all the cost. On the other hand when the employee is paying directly in cash a part of the cost himself, the pension plan is on a more secure foundation and the employee will be able to claim a share in the management, while the employer will find that he cannot make changes in the system without the consent of the employees. The essential point is that the pension benefits must be regarded as part of the remuneration for services and the premiums which produce these benefits are therefore part of the wages, whether they be paid as direct contributions out of a larger cash wage or as indirect contributions by the acceptance of a smaller cash wage. That is, in my opinion, the foundation stone of a permanent pension system. When it is clearly recognized that the remuneration of the employee consists partly of a cash wage and partly of a deferred wage to provide pension fund benefits we are on solid ground. This principle has received the highest endorsation—it was recognized by the Imperial Parliament of Great Britain in the Pensions Act of 1909 and has been endorsed by most modern writers upon the subject.

How then are we to deal with the cases of the older employees who are in the service when the system is to be started? Some of these men are at such advanced ages that the proper cost premiums in their cases would approach or even exceed the whole of their wages. They cannot be asked to meet these premiums themselves directly or indirectly. The fact is that the pension system should be considered and the benefits decided upon and the premium rates ascertained without regard to the present employees. The whole scheme should be devised with a view to improve the service in respect of the men who will thereafter enter the service. When that has been done the corporation should consider the cases of the men now in the service and give them, as an act of benevolence, such a sum as will, together with the future premiums on their behalf, provide the benefits to which they may become entitled. The future premiums of the younger men among them will leave a comparatively small liability to be provided for, but the future premiums of the older men will leave a very large liability. It is a fortunate corporation that can meet this accrued liability in full. Generally it will be found that the older men cannot be granted the full benefits. In any event they will be much better off than the men who left the service before the pension system was adopted

Must Have Business Principles as Well as Benevolent Instincts

This may sound very unsympathetic to old employees. Such men make a strong plea to our humanity. There are not many of them. Surely we can afford to pension them? Their little pensions look pitifully small compared to the total revenue and the temptation to deal with the matter on a revenue basis is very strong, but I am convinced that any pension plan drawn up with the idea of treating old men on this basis will, ultimately collapse. It is the fallacy which has wrecked so many fraternal insurance schemes. Death claims and pension payments cannot be regarded as current expenses to be ignored until they arise. All such payments that may ever occur in the future to every member of the staff must be regarded as "bills payable" and must be taken into the balance sheet at their discounted value on the date of that balance sheet and there must be assets to offset them. In short, pension systems are a serious undertaking. We must have business principles as well as benevolent instincts.

Whole Question Intricate and Involved

I seem to have harped upon principles and neglected interesting details. The whole question is so intricate and involved that it is very easy to get lost in details. There are many of them to which I have only referred in passing or which I have omitted altogether. I have not dwelt upon the fairly obvious conclusion that the corporation which adopts a pension system must recruit its staff from young men, nor have I referred to the difference between the requirements of the office staff and those of the factory or field staff, or to the difference between the attitude of male and female employees toward any pension plan or to the question of widows' pensions, or the relation between the main benefit—the pension—and such sibsidiary benefits as life insurance or payments on dismissal, also I have made no reference to the question of management or the investment of the funds. For all these omissions I crave pardon, pleading that the time at my disposal was short and that I was anxious to establish the fundamental principles in the light of which so many of these details must be considered. If those principles are accepted, it will be easy to work out the details. If they are not accepted there is nothing to which we can relate the details.

Nothing Too Small to be of Use in Advertising

As a proof that good salesmen think nothing too small to be of use in advertising appliances here is an instance noted in a large store recently. A gentleman after conducting his business with the salesman, asked for the address of another place of business. He was given minute instructions as to how to find the place and then the address was written down on a toaster pamphlet, instead of a blank piece of paper. Every time he looked at the address he would be confronted with the picture of a toaster.

43,750 kv.a. Turbo-generators

Two 60 cycle turbine-generators which will be installed in the new Hell Gate station of the United Electric Light & Power Company of New York will be of the tandem-compound type each rated at 43,750 kv.a. at 80 per cent. power-factor or 35,000 kw. They will be designed to carry peak loads of 40,000 kw. for short periods. These units which will be built by the Westinghouse company will be similar to the 60 cycle units installed in the Northwest station of the Commonwealth Edison Company, with the exception that the new units will have a larger capacity. The generators will be designed for 13,200 volts and operate at 1200 r.p.m. The turbines will be designed to operate at 220 lbs. steam pressure, 200 deg. F. superheat and 29 in. vacuum. They will have reaction blading throughout. The high-pressure element of this type of machine is single-flow and the low-pressure element is double-flow.

The Contractor-Dealer

Vancouver Electrical Men Had Most Successful Convention—M. K. Pike an Enthusiast — W. L. Goodwin Urges Contractors to Discard the System of Lump Sum Bidding — Northern Electric Supply Enjoyable Entertainment

Co-operation was the keynote of the entire programme of the Electrical Convention held in Vancouver on the last day of May and the first day of June. That topic in all its phases as applied to the electrical industry occupied nine-tenths of the convention's time it is fair to estimate, during a two-day session which had no idle moments, and into which was packed a long and interesting, as well as instructive, agenda. As Mr. W. McNeill, assistant general manager of the Western Power Co. of Canada, put it in his address at luncheon the first day—"the convention was nothing more nor less than a school with a highly intensive course of study for two days."

Assembling in the Rose du Barry room at the Hotel Vancouver on Monday morning, the members of the convention listened to a hearty welcome greeting from Mayor Gale, who assured the delegates who were visitors that the city was theirs. He also pointed out modestly as becomes a Vancouver mayor, that "You have come to the brightest spot on the North American continent to hold this convention and the gates of the city are open to you." Referring to the important part which electricity, and the industry built up round it, now plays in the everyday life of every citizen, His Worship, who casually mentioned that he had been ten years connected with electrical development, emphasized that practically all modern improvements were now electric appliances, and he predicted greater developments in the future than the industry had seen up to the present. He said it augured well that they showed such fine esprit de corps, and in this spirit of get together which they displayed, he saw great improvements in the conditions surrounding the trade.

President E. Brettell read letters of regret from President Ballard of the National Electric Light Association, and from A. B. Godfrey, manager of the Okanagan Telephone Co., and also announced that that much to the regret of the convention Mr. Samuel Adams Chase, of the Westinghouse Electric, Pittsburgh, was in hospital in California and would not be present to deliver the address set down for him. Mr. Harry B. Kirkland would however, read a summary prepared by Mr. Chase and explain a series of charts, showing the work done in putting over the "Co-operative Idea" in electrical merchandising.

Kirkland, the "Peptomist"

Mr. Kirkland, general manager of the American Conduit Company, was introduced to the convention by Mr. J. F. Little, Vancouver, manager for the Northern Electric Company, who said he had known the distinguished visitor for many years, recalling when more inspiring spirits were obtainable than under present prohibition rule. He called Mr. Kirkland the "peptomist" of the electrical industry. Plunging directly into his topic, Mr. Kirkland in a brief and pithy address explained that he was present to awaken the interest and confidence of the contractor-dealer in the present and future prosperity of the electrical industry. Two billion dollars of electrical merchandising for 1920 was being prepared for by manufacturers, central stations, jobbers and dealers throughout the American continent. He was not prepared to say just what percentage of this enormous business was allocated to Canada, but judging by what he saw and heard in his travels through the country Canada would have her full share. He wished to impress the necessity for orderly organization in order to successfully handle such an enormous volume of electrical business. Confidence, common sense and the square deal for all were the elements to build success. On those lines something constructive could be accomplished.

Mr. E. Brettell, President B. C. Ass'n. Electrical Contractors & Dealers

Illustrating the wonderful expansion in the manufacture and sale of electrical appliances, Mr. Kirkland spoke of the number of manufacturers of electric washing machines, an industry which had made a very modest start. To-day they were planning for the marketing of 1,100,000 machines in 1920, and there were other makers not in the list he spoke of. There were 100,000 sewing machines being turned out per annum, and that was not all, for this figure did not include the many companies which made special types of heavy sewing machines fitted with electric power for tailoring, shoemaking and other trades. To show how organization began with the manufacturer, Mr. Kirkland said that in order to figure out production, the manufacturer estimated consumption on a per capita basis in every area, and from that made his plans for output. Merchandising was al-fully organized from the manufacturing and distributing end, and it was the aim of those engaged in the electrical industry to complete this systematic organization right through every branch, central station, jobber and retailer to consumer.

Edison's Wonderful Vision

Briefly addressing the convention on the value of local advertising in pushing merchandising of electric appliances, Mr. O. H. Caldwell, editor of Electrical Merchandising, New York, urged close attention to the building up of merchandising in the home. The size of the household field for selling electrical merchandise was shown by the speaker in referring to a recent industrial development planned in Brooklyn, where the total capital of $20,000,000 was to be invested in the industry. On the other hand the investment for merely housing the employees of the proposed industry was figured at four times that figure, or $80,000,000. That emphasized the size of the household field as compared with the industrial. Outlining the policy for the retail merchandising of appliances, Mr. Caldwell dwelt on the necessity of co-operation between all the groups, the central station, the wholesale dealer, the jobber and the retailer. Selling service rather than merchandise was after all the common ground on which all groups met. He mentioned that in Portland, Oregon, he had noted the Electric Light Company had an arrangement whereby consumers paid their light bills at the stores of dealers in electrical goods. He thought the lists of the central station should be available freely to all dealers for advertising purposes. There were so many new devices, so many advances being made in electrical equipment, that only by co-operation could the fullest measure of success be gained. That was why selling service was so important. Proper outlets for machinery and appliance attachments should be installed in every house. Standardizing of attachments was another matter for co-operation, as well as that of advertising.

An Enthusiast for the West

Speaking at the first morning session of the convention on the subject of "How the Electrical Industry of the West Impresses me," Mr. M. K. Pike of Montreal, general sales manager of the Northern Electric Company, said he was first an enthusiast for the west, and second an enthusiast for the electrical industry. He was sure every one of the visitors would become an enthusiast for Vancouver. They could not help it. The impression they would get was that it was difficult to over-rate the possibilities for this city and province. He had visited here many times and had that impression from the first. Montreal was now the metropolis of Canada. He would not be surprised if in a very years Vancouver would make the eastern city hustle to maintain her supremacy. Here in Vancouver they had one of the greatest shipping centres of the future, partly because they had such a great port, open all the year round. Then the resources of the province were such as lent themselves to development on a generous scale. It was important for electrical people to prepare. With her water powers, many of them not yet developed, British Columbia was a great field for the industry.

Discussing the problems common to the electrical trade, Mr. Pike said it was high time that merchandising of electrical goods should be lifted out of the position of being mere side lines for hardware, drug and jewelry stores. It was not good for electrical merchandising. It was perhaps our own fault in the past, said Mr. Pike. We had not been working together as we should, and therefore had not been lifting up the merchandising of electrical goods. In the past two or three years the merchandising movement had taken hold. Such meetings as that now being held showed that the spirit of co-operation was spreading. In the past,

Electrical Convention, Vancouver, B.C., May 31, June 1. Group of Vancouver Electrical Contractors and Dealers with visiting delegates, photographed on Court House steps, Vancouver, during Convention. W. L. Goodwin in centre of front row with President Brettell on his left and M. K. Pike on his right.

organization had not been such that they could realize the possibilities of the industries. Now, however, they were getting together—"helping ourselves and helping the other fellow," said Mr. Pike. "And we will reap the benefits of this co-operative work, as we have already begun to see." He felt sure that it was going forward, expanding and becoming the permanent dominant factor of electrical merchandising and indeed of the whole industry.

The real cause of the high cost of living, in Mr. Pike's opinion, was that too many people were trying to get more for service rendered than it was worth. What the leaders in electrical merchandising were trying to put over was the idea of the most and the best service possible for the money, which was approaching the matter from the opposite point of view, which he thought was the correct angle. He warned the convention that while the possibilities of electrical merchandising were enormous, as they had already heard during the morning, they were not getting ready to meet it. That was what they were met together now to try and promote. In this matter of getting together the west had taught the east many lessons, was Mr. Pike's remark at the end of an all too brief address full of practical ideas.

Mr. H. Pim, veteran western manager for the Canadian General Electric Co., commenting on the suggestion by Mr. Pike that the selling of electrical goods should be taken out of the hands of shops that merely made it a side line, remarked that more incandescent lamps and more appliances were sold through other dealers than through electrical dealers. That was a strong argument for the get together movement.

Enter the "Arch-Peptomist"

If Mr. Harry B. Kirkland was correctly described as a "peptomist"—a combination of optimist plus "pep"—then, said President Brettell introducing to the convention, Mr. W. L. Goodwin, here was the "arch-peptomist." Judging by the extra hearty reception accorded to him, the Vancouver Association and the visiting delegates all agreed. Mr. Goodwin was no stranger in that assembly. He had been a prominent and active delegate and speaker at the convention just a year before, and so much appreciated were his efforts in helping on the good work begun by the Vancouver Association of Electrical Contractors and Dealers that the strongest kind of invitations were sent to him to insure his presence at the 1920 convention. In most vigorous and unvarnished terms he talked to his confreres and told them just what he thought of certain of their business customs, habits, mistakes and shortcomings. Even though the association was as much that of contractors as dealers, he told them that the contractor "Is just a parasite on the industry,"—that certain of the methods adopted by some people in getting the business classed them as "burglars," and that certain customs, to wit jobbers and dealers supplying material to "fly-by-night" contractors on the sole security of the chance of their making a profit out of some contract they had signed up, were plain foolishness. All this, and much more, in most emphatic language, he told his hearers in the course of a highly interesting and instructive talk before the convention adjourned its first session.

Continuing Co-operative Development

What previous speakers had touched upon and given much emphasis to,—the expansion of the co-operative idea in electrical merchandising, Mr. Goodwin took as his chief topic in this first address to the convention. The highest human development, he said, demanded the greatest dependence one upon the other. No man could live to himself and develop as he should. In the electrical industry lack of progress was due to lack of realization of the importance of their responsibilities. The electrical dealer, contractor, jobber, or whatever group he might be classed in, can and must render the service expected of him and required by the people. That department store-drug store-idea they had heard of in Mr. Pike's address must be got away from. The people themselves demanded something better. There were excellent reasons to be urged for buying electrical goods from electrical dealers only. Not dependable repair service, but the intelligent service that supplied equipment so as to avoid the necessity of repairs was the strong line of argument.

To make a right start and to develop on right lines those interested must do their thinking in terms of the whole electrical industry—the manufacturer, the wholesaler, central station, jobber and retail dealer must all be considered. That was the ideal, and then to plan to work out the problems arising common to all sections of the industry, they must co-operate. For that, just such a start as had been made in Vancouver and now being carried on by this convention was what was wanted. He felt that they were organized on promising lines and would continue to make progress. Speaking of the outlook in British Columbia, as he saw it, Mr. Goodwin pointed out that electrical development in this province would come with the development of the numerous large water-powers. There would be important problems of water-power companies with capital invested in large amounts in the next few years. Light is the first requirement in the mind of the man in the street. But there was more to it than that. In order to get people interested, the electrical industry must first make it attractive and then inspire confidence. Improving the method of all future installations, especially in preparing the home for household labor-saving appliances was most important. Then the artistic side must receive as much attention in electrical equipment as in rugs and furniture to appeal to the people. The responsibility is on the local organization in every centre, for carrying out the spirit of co-operation and service as they have to live up to it the whole year, not merely during the two days of the convention, said Mr. Goodwin, who reserved further comment for later sessions.

Visitors Introduced

During the morning session of the convention, a number of visiting delegates were introduced to the convention by President Brettell. Among them were: J. B. Burns, of the Harvey Hubbell Co. and the Crouse Hinds Co., Toronto; D. C. Macfarlane, purchasing agent for the Canadian Collieries, Victoria; W. J. Brady, a director of the Faries Manufacturing Co., Decatur, Ill.; H. F. Gleason, of the Hoover Co., Seattle; S. J. Halls, commercial sales manager, B. C. Electric Co., Victoria. Each spoke very briefly, Mr. Halls commenting on a suggestion of Mr. Caldwell by saying that the lists of his company were open to dealers, and that in a very short time they had mailed out for local electrical dealers over 100,000 pieces of advertising literature.

T. & M. vs. Contract Bids

The Monday afternoon session of the convention opened after a pleasant social luncheon meeting, at which Mr. McNeill of the Western Power Co. of Canada was the speaker. It had been arranged and set down on the programme that Mr. Samuel Adams Chase, of the Westinghouse Electric & Mfg. Co., Pittsburgh, should open the afternoon session, but unfortunately he had to remain in California through illness. His paper, outlining the basis of his address on "Stop Raising Cain and Co-operate," was read in his absence, by Mr. Harry Kirkland, who also showed some of the charts prepared by Mr. Chase, covering the spread of the co-operative movement, and showing the work done, places visited, meetings and conventions held, etc., in the U. S. since the movement began to spread. Mr. Chase has been closely

To the left—Northern Electric Company's Vancouver staff. To the right—the same staff as "Minstrel Troupe." Personnel as follows: Front row, left to right—R. T. McFarlane, John McColl, A. A. Tufford, H. W. Sellars, Geo. Brisco, R. C. Caverly. Back row, left to right—K. W. Hewitt, H. Morris, C. K. Dunbar, W. C. Mainwaring (District Sales Manager), J. M. Meldram, H. E. Richardson.

identified with Mr. Goodwin in the co-operative movement throughout.

In a stirring address taking up a large part of the afternoon session, Mr. Goodwin discussed the system of installation of electrical wiring and other work on the "time and material" basis instead of by bids.

"Electrical contracting on the bid basis is an economic waste," declared Mr. Goodwin. Installation by contract is actually not more than 2 per cent. of all electrical business. Why then jeopardize 98 per cent. of the business for the sake of that 2 per cent., he asked. No money had been spent by electrical contractors in promoting the interests of the electric industry. Another objection he registered was that the contractor,, in order to make good on his bid was forever trying to omit some of the essentials from the work—of all buildings not properly equipped (and there were many such) most would be found to have been done under contract. It was neither for the convenience of the consumer nor for his benefit. The contract system lends itself to trickery argued Mr. Goodwin. Yet it cannot be separated from the electrical industry, which had to bear the responsibility. Lump sum contracting is not, never was and never will be in the interests of the industry. "What's the answer?" asked Mr. Goodwin, who proceeded to answer by proposing the general adoption of the time and material plan, which he said was a success wherever put in force. In his own business he had long ago thrown out the contract business offering. The price obtained should be a measure of the cost.

Speaking of the U. S. and conditions there, with which he was familiar, he said that for twenty years the "contractors have been the charity department"—they had to be financed by the manufacturer or the jobber, their credit rating was at the bottom of the list, they never carried any local advertising. To clinch his argument as to why electrical contracting was not a business proposition, Mr. Goodwin divided it under a number of heads:—

1.—Taking off a bill of quantities is largely a guess; if real specifications were prepared in a business way there would be little chance for doubt, but the trouble was these were not prepared on a quantity system but were blanket specifications;

2.—Value was "guess No. 2"—not a man here can take off a bill and say that, installed, the cost would be a certain amount. The time factor comes into the question

3.—Labor always will be a guess—the word is passed along—and leave it to the walking delegate, if the contract price is known;

4.—Overhead is another guess. It is always worked out on an average, but it varies with the character and size of each job;

5.—Profit is always determined by guessing what the other fellow is guessing he will do it for; the profit guess never bears any relation to cost of material or time, it takes no account of change of costs nor of the time and labor tied up while the contract is under way;

6.—Extras—had they ever heard of an original contract price bid at $190 with extras of $2,000 or $3,000?

Then, said the speaker, the contractor adds all the guesses together and puts in his bid. When we hand it to the architect or general contractor he looks at it and suppose we have "guessed" $8,000. He at once says "I guess not. I guess you will do it for $7,200." "And what then? Do we take it at his figure? "I guess we do, every time," commented Mr. Goodwin amid general laughter.

Now, concluded Mr. Goodwin, we cannot go on guessing. Under the contract system the general public comes to the electrical industry with a proposition. Seventeen or eighteen men are put on at a cost approximating 3 or 4 per cent. of the contract for each one, to do the estimating. If that cost alone were added we would be sure of having a little profit. It is a most treacherous method, and if the contractors are gamblers, they must put on something for taking the chance. The way it works out badly for the public is that supposing one man gives a job on time and material basis and a second man on the contract basis, the latter is penalized. The first gets what he pays for and the other fellow thinks he does. This sort of thing has been going on for twenty-five years and the public reflects on the whole electrical industry which is thus suffering injury. The contractors have struggled and found no solution to the problem. It is up to the wholesalers and manufacturers to take hold and help solve it. By putting it on a time and material basis the contractor would be lifted up to a different plane. Then the industry could go to the people and say—"We are not gamblers"—that would establish confidence. We cannot afford to go on in the old way. It is going to take time, but it is worth it. The dealer should say to the contractor that he is not giving firm prices, that he will not protect him, that he will not give credit on contract work basis. Put it on SERVICE basis. Go to the public by the advertising method, and in time you will get them with you.

Tea with Ladies in Stanley Park

The first day's sessions concluded with a trip to Stanley Park, where the wives and daughters of the local members had assembled with the visiting ladies at the pavilion and on arrival of the masculine persuasion, high tea was served. In the evening a banquet was given to the visitors and friends at which some bright local hits were presented by the Northern Electric "Minstrel Troupe" composed of the local sales force of that company. The programme presented was the result of much hard work in preparation and reflected great credit on "Bill" Mainwaring, head of the sales force, who acted as interlocutor, and the other members of the troupe.

Concluding with Question Drawer

The business sessions concluded on Tuesday morning with a question drawer, presided over by Mr. W. L. Goodwin, who in his usual crisp incisive way answered plainly and bluntly the many questions based on the planks of his co-operative platform. Much good no doubt will result from the clearing up of points in doubt and also many technical questions.

The morning session opened with a brief address from Mr. E. E. Walker, sales engineer of the B. C. Electric Railway Company, who said he would like to see a more definite plan in the retail end of the electrical business. The cooperative advertising campaign adopted two or three months ago by Vancouver dealers had been working well. He also pointed out that architects were not posted on installation work so that provision could be made in new construction, especially of houses, for outlets and connections for labor-saving appliances. He introduced Mr. J. Lightbody, publicity manager of the B.C.E.R., who presented a most interesting paper on co-operative electrical merchandising, the value and method of advertising being well explained. Mr. Lightbody's paper is published in this issue.

To conclude the social entertainment of their guests in fitting style, the last afternoon was spent by the entire convention with their ladies as guests of the B.C.E.R. on the steamer Britannia, the trip up Burrard Inlet past the company's hydro-electric power houses ending at Wigwam Inn where a dainty supper was spread. In the evening a dinner and cabaret entertainment was given, which was most heartily enjoyed. At the luncheon tendered by the Rotary Club on the second day, Mr. W. L. Goodwin, a charter member of Rotary, was the speaker, and in forceful and entertaining manner he delighted the joint assembly of Electricians and Rotarians with his original views and manner of expressing them.

Greatest credit is due President Brettell and his executive committee as well as the organization committee and the association secretary, Mr. R. G. Hargreaves, for the manner in which the second convention of the association was carried out. The organization committee consisted of J. F. Little, S. E. Jarvis, R. G. Hargreaves, W. W. Fraser, E. E. Walker, and E. Brettell,, president. Messrs. Brettell, Jarvis, H. V. Rankin and C. H. E. Williams comprised the executive committee, while every member of the association was on the reception committee.

The electrical work on the new theatre at Kingston, Ont., will be let. General contractors Messrs. Norman McLeod, Ltd., Kent Building, Toronto, Ont.

Co-Operative Merchandising Methods

The following paper was presented at the Electrical Convention, Vancouver, B.C., on June 1st, by Mr. J. Lightbody, publicity manager of the B. C. E. R. Co., and the speaker amplified his remarks by quoting extensively from the proceedings of the California association, which had been pioneering for some years in co-operative merchandising. In connection with their work, Mr. Lightbody explained their method of advertising, which had been so successful. His remarks were supplemented by Mr. Goodwin, who had been one of the first to take part in the movement when it was set going in California, and who still takes a lively interest in it. Mr. Lightfoot said:

The subject I am to talk to you about is not advertising, as on the programme, but merchandising. We have heard a great deal about the necessity for co-operating and I am sure we are all convinced of that. Let us, therefore, leave generalities and get down to particulars of how we may co-operate.

Co-operation always seems to me to be mostly in evidence at a convention but a week or two afterwards it has petered out and when the next convention comes along, the two days allotted to it are too short to cover everything.

Don't let our enthusiasm die away in a week or two. Let's get busy and organize ourselves and not be dependent upon outside help. Let's get together the rest of the year and air our troubles.

This means work for someone. It means a great deal of effort, but I am sure there are many here, from central stations and manufacturers and jobbers who will be glad to do the pioneering work to help organize a proper co-operative association, to help the dealers.

While I will try to get into particulars, there will not be time to take up many details of merchandising. However, if I can start you thinking I will have accomplished something.

To the Dealer First

I am going to talk to the dealer first, although he is probably in the minority in this gathering. I will have something to say to the other factors in the industry a little later.

We must think of our business not in terms of mere articles, but as an idea—the electrical idea. That is what we have to get home to the public if we expect them to buy our goods. The idea has to be put across on a wholesale scale. The business in electrical devices has to be created out of nothing.

It is like the gramophone business. A few years ago nobody had gramophones. To-day nearly every home has one. Why? Because of the extensive advertising and selling campaigns by dealers and manufacturers.

I wonder if you realize what a fundamental change has taken place in people as a result of gramophone selling. I saw in Printers' Ink the other day an example of this. It said that it was quite usual to-day to hear a messenger boy whistling a piece of classical music. Ten years ago such music would have been within the reach of a select few. The gramophone has made the difference.

Look at the automobile industry. Sections of the newspapers are filled with news and advertising about automobiles. There are jokes about automobiles in the papers and on the stage. Why should the electrical merchandising business not be just as prominent?

Do you realize that it requires only some effort by everyone in the business to make it just as prominent

Put the same effort into electrical merchandising as is put into the automobile business and you'll have every house with some appliance. You'll have them buying new models every year as they do automobiles.

You'll get more publicity as a properly organized body, too. To-day, because you are disintegrated, you get none. As a body, the newspapers and public bodies will listen to you.

I want to impress this point most strongly upon you, and that is, that the electrical business is not ready made. You must make it yourself. It requires, therefore, the utmost care in the correct merchandising of your goods. It requires, moreover, the concerted efforts of all four factors in the industry. It is too big an idea to be put over by any one factor. It needs them all and it needs them all in co-operation.

The definition of co-operation I like, which you may have heard, is that whereas the effort of one man added to that of another not in co-operation are as the sum of one plus one, namely, two, but in co-operation they are as one plus one squared, namely four.'

Why shouldn't everybody co-operate? There is no reason in the world, except that they don't. Nobody has started them to co-operate. Nobody has got together the organization.

Yet there are organizing brains right here in Vancouver. They are to be found in the manufacturers, jobbers and the central stations. Let us look at it as if the dealers were too busy to organize. Then, these other factors who have the skilled men should start to organize the whole industry into a definite selling campaign—selling not appliances only, but selling service.

What are the actual conditions? Each of the four principals is doing its share but not in co-operation. We have been successful in starting a co-operative page in two of the newspapers in Vancouver, but the stormy seas are not yet over. We have still some hard work to do.

I cannot do better to exemplify co-operation and self-interest than point out instances of advertising. I can show you advertisements inserted singly in newspapers and lost, And I can show you advertisements inserted in complete electrical pages and having great pulling power.

Yet in these co-operative pages we have been successful in starting, all is not plain sailing. We are having trouble to-day in getting dealers to change their ads. Some have been in these pages ever since they started, and have never changed their ads. It follows that they will not get results and they may drop out as dissatisfied advertisers. As most of them were "from Missouri"—they had to be shown that advertising paid—they may, by dropping out cause the failure of the whole page with a resulting loss to the whole industry in Vancouver.

Here is another way in which one dealer may do harm to the whole trade. A few weeks ago a dealer in Vancouver advertised washing machines at the total cash price—about $180—although everyone knows that it is the time payment that makes the sale. The result of that might be that dozens of prospects of other dealers might be lost through the bad psychology of suggesting the lump sum.

There may be a mistaken idea that we should not help the other man to do his advertising and promote his business. But the idea that when one man forges ahead he cuts into another's business is wrong. Especially is it wrong in a business such as ours in which we create all the business we get.

It has been proved time and again that when a second store of a kind starts up in a town and advertises, it brings business to the original store.

We have an instance in our own business. A few years ago the B. C. Electric Railway Company was the only concern advertising power for the farmer of this district. In the last year or two private plants have been advertised, and, instead of our applications falling off, they have increased more than ever, although the volume of our advertising has really decreased. The private plant advertising has helped our business and no doubt our advertising laid the foundation for it all.

No Dealer a Law Unto Himself

That brings me to my main point—that the way each of you conducts your business instantly reflects upon the rest and vice versa. Poor advertising keeps back the whole industry. A sloppy looking store makes the whole industry suffer. A smart store elevates the plane of all electrical merchandising. No man is a law unto himself in the electrical business any more than in ordinary life.

Yet in propounding this doctrine we are not altruistic nor wholly selfish. It is all good business. The co-operative plan will put the electrical idea across in better shape and more quickly than any individual action.

Let me give you a few suggestions about co-operating.

First we must have an exchange of ideas as in this convention. Have half-yearly conventions if necessary, But lets get into the discussion. Let's discuss sales methods and campaigns.

Then we must take up scientific selling in the way Mr. Goodwin explained last night. Let's criticize each other and keep each other on our toes.

Happily we have made a start in the electrical club of Vancouver and I would suggest to every electrical man in the city that he become a member of that club right away. It meets at luncheon every Friday and during the coming year we hope to discuss such matters as have been taken up at this convention.

During the coming months we must teach ourselves proper selling methods, window display, advertising, etc.

As a co-operative movement we must make a concerted attack on public ignorance and inertia. We will make a greater impression as a body than as separate units. We should put the electrical industry in Vancouver on the map.

Organize a Co-operative Movement

That means that local talent must get busy. The manufacturers and jobbers and central stations all have men with organizing ability. The first moves must come from them. These companies should release men for no other purpose during the next year or two than organizing a co-operative movement in Vancouver.

It will require a great deal of personal effort on the part of some. Nothing can be obtained without.

First we must talk co-operation in merchandising to everyone. I am trying to convince you. Now, if any of you feel this way, go out and convince others. One or two can't put the idea across. We have to train our salesmen first.

I am convinced that we have touched only the fringe of electrical merchandising in British Columbia. The public is in the most elementary stages of education in the use of electrical devices. There must be a widespread advertising and selling campaign to bring us up to where other parts of the country were a few years ago.

But the business is here. It can be obtained if we only get out after it.

"The Delta-Star Electric Company, Chicago, Illinois, are distributing Bulletin No. 303, describing their 100 ampere, 600 volt, 3-phase plugs and receptacles, for extra heavy duty. These equipments are included in the list of electrical appliances issued by the Underwriters laboratories.

The Electric Supply Company Ltd., of Vancouver, have one of the most attractive retail stores in Western Canada. The business is owned by Messrs. Brettell, Perry & Churchland, Mr. Brettell having charge of the merchandising and service end, shop window display, etc.

Western Canada is Becoming Noted for Its Handsome Stores—Here is One of Them

First organized in 1909, the Electric Supply Company, now a limited liability concern, the three directors of which are Messrs. R. V. Perry, E. Brettell and J. Churchland, has always carried out its business policy based on the greatest faith in the future of the electrical appliance business. To-day the premises occupied are in the very centre of the high-rent retail district of Vancouver, close to the handsomest retail shops, jewelry stores, hotels, ets. and are a credit to the owners and to the electrical trade. Recently the company has completed the installation of additional shop fixtures which perfect the display methods in vogue in their attractive shop. The entire interior is in red mahogany and Australian red gum, cabinets, wall show-cases and glass-fronted cupboards taking the place of the more inaccessible showcase with its contents displayed to the view, but not to the touch of the customer. In the newly-fitted store, with its bright and expensive fittings well calculated to display the attractions of electric appliances, the would-be customer may walk in and handle the particular article in which he is interested. Along one side of the entire store is a series of cabinets in which are displayed samples of the splendid variety of parlor and library lamps, each set alone to better show its beauties. Along the other wall are all the labor-saving appliances and indispensably useful articles of electrical device known to modern homes. These are so displayed that they can be attached, as they would be in actual use, the shop fixtures having an abundance of outlets and sockets for every sort of connection. In handsome mahogany cupboards, conveniently arranged along the same side, are carried the stocks of staples, lamps, sockets, etc.

Formed first by Mr. Perry and the late Mr. C. Peacock, as a private partnership, the Electric Supply Co., became a

The two views shown indicate that Mr. Brettell and his partners place a proper value on attractive windows and store interiors. "Electric" and "Service" are interchangeable terms in their vocabularies.

joint stock company in 1913, when Mr. E. Brettell joined it. The company then moved from 806 Robson St. to its present premises at 781 Granville St., in the centre of Vancouver's best down-town retail section. The results since have amply backed the judgment of the company in taking this step. The fact that they have just completed, at large expense, the superior scheme of shop fittings in their store, indicates their intention to continue their policy of going where the trade is. The company was strengthened in 1918 by the addition of Mr. J. Churchland, who joined after the late Mr. Peacock retired, the latter's long illness resulting in his death in 1919.

From the beginning the company has consistently advocated the selling of nationally-advertised goods, as carrying the best recommendation in each line. Showing the steady growth of the business it is noted that the first month's cash sales in 1909, on starting business, amounted to $15, in addition to what contract work was done. To-day a staff of 16 people are constantly employed and each of the three directors takes his own department. Mr. Brettell undertakes the direction of merchandising, shop and window display and service to customers, giving personal supervision to his sales staff. Mr. Perry, who handles the accounting and finances of the company, also co-operates with Mr. Brettell in the store management, while Mr. Churchland devotes himself to the contracting department, looking closely after the house-wiring and other outside work.

Toronto Electrical Contractors Hold Final and Most Enthusiastic Meeting of Season

The final dinner and meeting for the season of the Ontario Association of Electrical Contractors and Dealers (Toronto District) was held in the Board of Trade rooms, Royal Bank Building, Toronto, Ont., on the evening of June 3rd, 1920, a fair number being present.

Subjects of importance were discussed freely. Mr. Gray raised the question of the possibility of danger from the unions misusing the power vested in them if their wish for a closed shop was acceded to. Mr. McIntyre, in reply, said that the best way to overcome the danger of such a possibility was to recognize the union in such a way that it would call forth the best element among the men as leaders. The tendency of the unions is strong towards it and sooner or later it will be forced upon the contractors. The best policy then would be for the contractors to submit to the unions' wish on the subject before pressure was brought to bear, by means of strikes.

Mr. McIntyre also made reference to the system of sympathetic striking, saying that he believed that as a means of coercion it was losing its hold upon the men. They were beginning to see the unfairness of the method, realizing that often instead of gaining the points they were striking for it meant that work went to non-labor union employers and that was bad for the trade.

There was no opposition to the question and the concensus of opinion was that it would be better to have the matter settled once and for all.

A request had been sent in to the Association, asking that they join the movement within the building trades for further development of the Safety League. It was proposed that an inspector be employed to act in conjunction with various associations to take any measure thought necessary to minimize the risk of accidents. Mr. Harry Hicks was appointed to meet the delegates of the other building trades to discuss the matter further, and if he thought that the good resulting from such a movement would warrant the further assessment on the Association's fees towards this object he was to take the necessary steps to join with the other associations in the movement.

Mr. W. C. Carthy, chairman of the Merchandising Committee, made a report. This committee had had a number of meetings, several of them jointly, with a similar jobbers' committee, and the scope of their work was becoming more clearly defined. The question of discounts and resales will be taken up at an early date, and in the meantime members of the association were requested to use the products of those manufacturers and jobbers who had indicated a desire to co-operate with the contractor-dealers. These were enumerated in the report.

The committee also reported that assurance had been rceived from the receptacle manufacturers that in the near future the necessity of purchasing plugs with receptacles and plates would be discontinued. The report also mentioned that a number of Canadian attachment plug manufacturers now have a type that is interchangeable.

Revenue Tax Items of Interest to Electrical Contractors

The Association of Canadian Building and Construction Industries have taken up with the Department of Inland Revenue certain matters regarding the contracting industry which appeared to them to be ambiguous and have sent out a service letter to their members. As the matter concerned has reference to sub-contractors, as well as general contractors, the following information will interest the electrical contractor-dealers:

The tax is primarily one upon materials, and is not intended to be a tax upon labor. Labor used in the installation of materials is not taxed, but tax does apply to labor used in the manufacture of materials.

All contractors and sub-contractors have to pay one per cent. (1%) tax on materials used by them.

Tax on materials is payable on everything shipped or delivered on or after May 19th, 1920, unless it can be proved that the complete price was paid in advance of that date. Partial payment is not sufficient.

Building contractors and sub-contractors, though technically manufacturers, are regarded for the purposes of the tax as retailers, selling the consumer. Tax is not chargeable on the amount of contract, either between sub-contractor and contractor, or between contractor and owner.

If a contractor or sub-contractor manufactures materials for his work he is required to pay tax on cost of manufacture, including labor. He is not required to pay tax on installation.

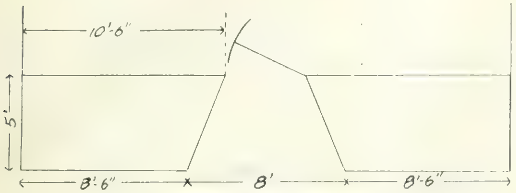
In the opinion of the Inland Revenue Department, contractors ought to be able to recover tax from owners on contracts made previous to May 19th, 1920, for goods purchased or delivered after that date. This is, however, a question of law. On future contracts, the tax should be provided for.

It is high time that merchandising of electrical goods should be lifted out of the position of being mere side-lines for hardware, drug and jewelry stores.—M. K. Pike.

The Store with the Deep Entrance Has Big Advantages—More Window Display Space Available—Attracts Shopper Who Dislikes Jostling by the Crowd

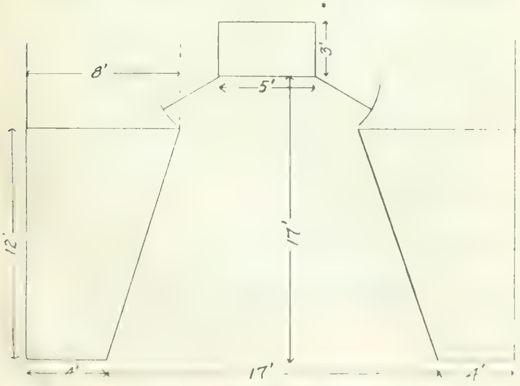
There is a growing demand among storekeepers for the store with a wide, deep entrance. The value of such an entrance is obvious—it gives greater window display space.

The go-ahead dealer of the present generation places his window or windows in a right relationship to his other methods of advertising, i.e., among the most important. Such a dealer never fails to get the most out of his windows. "Goods must be seen to be sold" is the slogan. If this is true a dealer must show his goods somewhere, and if he does not show them in the window he has but one alternative, and that is to show them in the store. This means using valuable space if the display is to be properly made. Those who would argue that since the best window dressers do not crowd their windows and that the same number of articles placed compactly in the store would take up very little space and serve the purpose just as well, entirely forget that if the goods are to be displayed to advantage they will take up just as much space in the store as in the window.



An old fashioned window plan

When a passerby steps into a store to enquire about an article seen in the window, that article is already partly sold to the enquirer. If for no other reason, then, space given up to window display is valuable.



The above window plan remodelled

Comparing the old-fashioned store with its shallow entrance and the type with the wide, deep entrance, it will be seen that no great value is served by the window space from back to front being deep, unless the window gazer can, in some position, get near enough to the goods on display to be able to thoroughly examine them. Suppose, then, a store with a 25 ft. frontage has a central entrance of 8 ft. and a depth of 5 ft., that would give—in the usual style of such stores—two windows 8½ ft. wide in the front, 10½ ft. wide in the back with a depth of 5 ft. The area of both windows' floor space would, together, give 95 sq. ft. On the other hand, suppose the entrance was 17 ft. wide and 12 ft. deep, the windows would each have a frontage of 4 ft. and the back 8 ft., the depth of course being 12 ft. The total floor space for both windows would be 145 sq. ft. In addition to this there would be space for a small window between the two entrance doors—as shown in the diagram—of 5 ft. by 3 ft. With this addition the total window display space would be 159 sq. ft., as against the 95 sq. ft. of the old-style store, a clear gain of 64 sq. ft. Now note that to accomplish this only 7 ft. more is needed from the depth of the store, a very little from the average store with a 25 ft. frontage, considering the big advantage gained from its added advertising value.

There are other advantages to be considered, too, from a store entrance of this kind. On rainy days many people will stop and show their usual interest in well dressed windows when sheltered from the rain, to say nothing of the people who merely step in for shelter and occupy the time examining the goods on display. What is more important still, it attracts the class of shoppers who rarely spend time gazing into shop windows, because of their dislike to being jostled by the passing crowd. Neither is there any obstruction to customers wishing to enter the store for, as a rule, the large entrance is capable of holding all who are likely to be examining the display at one time.

Much more might be said for the advantages of this type of store frontage and window space, such as the ease of trimming, lighting, keeping clean and so forth. but the prime advantages are sufficient to influence the wide awake dealer.

Big Results from a Window Display of Lamps

Don't make any mistake! your window does count as a means of advertising. Note this story told by a contractor-dealer, recently: "When I first laid in a stock of Mazda lamps, sixteen sold in six days was the best result I got until I made a special window display. The first two days after dressing the window the number sold was over 100 and, moreover there has been a steady sale for the lamps since that time."

Attend to Details

Two women were recently overheard discussing a storekeeper with whom they both dealt. The conversation was in regard to the dealer not keeping books, or in any way keeping "tab" on his stock. It was known that he had, on occasion, undercharged for some goods and overcharged for others. Finally one lady concluded the conversation by saying, "Well, that is no person with whom to deal. A man who is not honest with himself is not likely to be honest with his customers."

This incident points to the surprising interest the average customer takes in the details of a store's management, and how much it is likely to affect the sales of such a store.

The Moloney Electric Company have issued catalogue No. 195, which is made up of illusrations of actual installations of Moloney transformers. They include voltages varying from ordinary lighting load up to high tension 66,000 volt line.

So, on Fridays and Saturdays, he stages a demonstration of electric washing machines on the sidewalk

Contractor-Dealer Takes Advantage of a Good Location

To have an electrical store opposite to a picture palace and not make use of such a "gift from the gods" seems to Mr. E. A. Drury, contractor-dealer of 154 Oakwood Ave., Toronto, and one of the city's electrical progressives, like flying in the face of Providence. So on Fridays and Saturdays, at intervals, he stages a demonstration of electrical washing machines on the sidewalk in front of his store, where movie fans going to and from the theatre can see the many good points of this machine. Even the city authorities have bequeathed him a legacy useful for just such occasions, by making an unusually wide sidewalk in front of his store.

In the photographs shown herewith can be seen the six washing machines displayed, with show cards placed in prominent positions. One machine is fitted up to give actual demonstrations of clothes in the process of being washed and this can be seen in the centre picture. Working the machine is Mr. Harper, of Beaty Bros., Fergus, Ont., while Mr. Drury stands at the right with his hands on his money and a don't-care-if-I-do expression on his face. A clothes line is strung across the front of the window, on which is hung several garments. There is no fake about this demonstration. Hot water and plenty of good soap in cooperation with the washer, convince the onlookers that washing by electricity is a 'cinch.'

Mr. Drury says that he is quite pleased to see children watching the demonstration because they invariably go home full of what they have seen and talk about it to the adults.

Mr. Drury is more than a demonstrator of washing machines, he is a "seller" of this device, for they do not long remain on his hands. It is by just such methods of advertising as he has adopted that the machine he handles is so well known in that neighborhood.

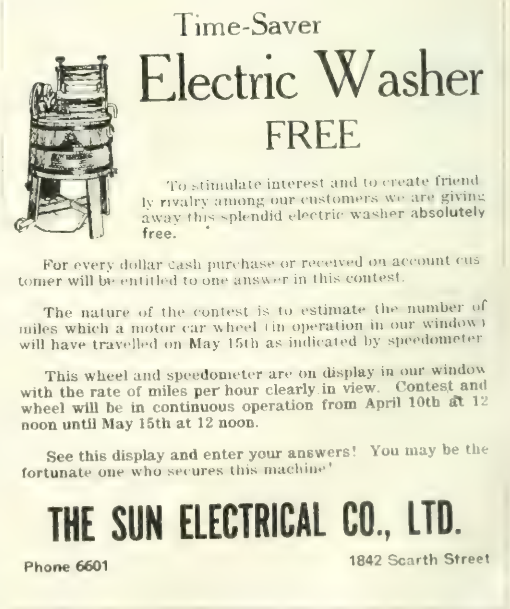
A Washing Machine Competition

The Sun Electrical Co., of Regina, Sask. has recently held a prize competition, the prize being a "Time-Saver" washing machine. The competition took the form of guessing the number of miles a motor car front wheel would travel in a given time. The wheel used for the purpose was placed in the window of their store beside the washer offered as the prize, and was driven by the washing machine motor. To the wheel was connected a speedometer which registered the number of miles per hour as well as the distance. The miles per hour were plainly visible, but the total mileage was sealed. The wheel was allowed to run continuously for thirty-five consecutive days. The contest went forward successfully and the total number of miles —14,325—was correctly guessed by one customer. One guess was allowed for every dollar paid in cash for goods, or on account, during the contest.

We publish a cut of the dodger used by this enterprising firm to announce the contest.

The Sun Electrical Co. had in mind when they staged the competition the acquiring of many new customers. In this they were a little disappointed, but are firmly of the conviction that had they staged it in the Fall, instead of the Spring, their object would have been gained.

Perhaps the results obtained would have been gained just about as well by offering a less expensive article as the prize. At the same time it must be said that they were warranted in expecting big results, considering the value of the prize offered.



Time-Saver

Electric Washer

FREE

To stimulate interest and to create friendly rivalry among our customers we are giving away this splendid electric washer **absolutely free.**

For every dollar cash purchase or received on account **customer will be entitled to one answer in this contest.**

The nature of the contest is to estimate the number of miles which a motor car wheel (in operation in our window) will have travelled on May 15th as indicated by speedometer.

This wheel and speedometer are on display in our window with the rate of miles per hour clearly in view. Contest and wheel will be in continuous operation from April 10th at 12 noon until May 15th at 12 noon.

See this display and enter your answers! You may be the fortunate one who secures this machine!

THE SUN ELECTRICAL CO., LTD.

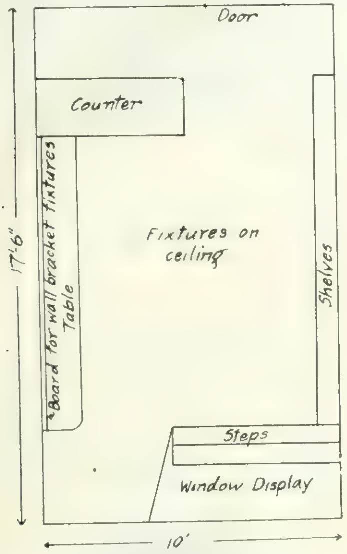
Phone 6601 **1842 Scarth Street**

A New Electrical Store

A new electrical store has been opened at 2958 Dundas St. W. by Mr. G. Wilkinson, one-time member of the firm of Dunn & Wilkinson, electrical contractors and dealers of Dundas St.

Mr. Wilkinson is specializing in appliances and motor work. He is stocking the Premier vacuum cleaner and the Universal percolators, toasters, irons, etc.

"The Popular Price Store"—for such is the name. Mr. Wilkinson has decided to call his business—is a neat little place laid out, as shown in the accompanying diagram. It is 10 ft. wide and 17½ ft. deep with a window frontage of 6½ ft. and a little over 3 ft. deep. The back of the window is formed in steps to make the best use of a small window. On the left of the store is a table fixed to the wall, 10 ft. long and 16 in. wide for displaying irons, toasters, etc. Above the table is a large panel built to within one foot of the ceiling, covered with green burlap, and on which is a display of wall bracket fixtures. On the opposite side, running from the back of the window space to a length of 12 feet, is shelving for globes and supplies. A small counter 5 ft. by 2 ft. runs from the wall across the rear of the store. Six boards attached to the ceiling carry ceiling fixtures. The floor is covered with linoleum and the whole store gives an impression of orderliness. We wish Mr. Wilkinson every success in his new venture.



Electrical Dealer Made One Order Sell Another

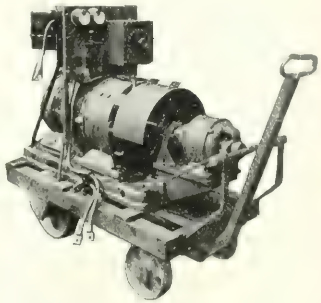
An electrical dealer recently sold an installation of lighting fixtures for a haberdashery in a nearby town. Before delivery was made he went to another haberdasher in his own city and explained to the owner that he would like to hang the fixtures in his store for a week so he could see how they worked and could study the distribution of light from them, giving as his reason that the store was similar in size and arrangement to that in the other place where he had obtained the order.

Consent was readily given by the proprietor for the tryout and the electrical man went ahead and made as careful an installation as if the fixtures were intended to remain. Then he told the haberdasher he would return in a few days and make some foot-candlepower measurements. In a week's time the dealer did this, being closely observed throughout the process by the curious proprietor. The dealer explained the even distribution of light—the absence of shadows and glare—giving full value to every part of the store and making it more convenient for the salesmen and more attractive to the customers. All this was done in a friendly, casual manner.

After pointing out other beneficial features of the equipment the dealer left, saying he would return in a few days to remove his fixtures and replace the old ones. But the fixtures were never removed.

Single-Operator Electric-Welding Outfit

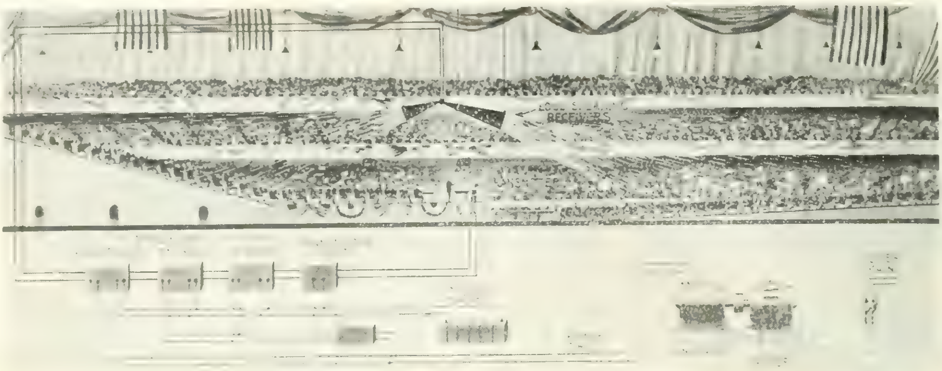
The single-operator electric arc-welding equipment manufactured by the Westinghouse Electric & Manufacturing Company is claimed to be exceptionally efficient because the generator operates at arc voltage and no resistance is used in circuit with the arc. The generator is designed to inherently stabilize the arc, thereby eliminating the necessity for providing automatic moving devices such as relays, solenoid control resistors, etc., which not only increases the cost of investment and maintenance, but may not be quick enough in action to follow the instantaneous changes of the arc circuit. The generator of the set has a rated capacity of 175 amperes, is of standard design and construction, provided with commutating poles and an exceptionally long commutator which enables it to carry the momentary overload at the instant of striking the arc without special overload protection.



The design of the control is such that very close adjustment of current may be easily and quickly made, and once made, the amount of current at the weld will remain fixed within close limits until changed by the operator. There are 21 steps provided from 50 to 225 amperes. This gives a current regulation of less than 9 amperes per step which makes it much easier for a welder to do vertical or overhead work often encountered in railroad shops and ship construction.

Electro Mechanical Advertising, Ltd., is a new firm incorporated with capital $50,000, and head office at Toronto, Ont. They will manufacture electrical advertising devices, and electrical appliances.

La Compagnie Co-operative Telephonique has been incorporated, with a capital of $20,000, to construct and maintain one or several telephone systems in the districts of Montmagny, Beauce and Quebec.



For the Republican Convention at Chicago the engineers of the Bell Telephone System successfully operated a voice magnifying apparatus embodying newly discovered features of telephony. An inconspicuous transmitter of speech was raised up a few feet from the front of the speaker's platform, and over head were suspended several receivers—rectangular wooden horns perhaps ten feet long with their open ends pointed towards various parts of the auditorium.

A Complete Cutter Handbook

The Cutter Company of Philadelphia have just issued a very complete handbook entitled "Handbook of the I-T-E Circuit Breaker," splendidly illustrated and bound in attractive stiff cloth covers. This new publication is based on the third edition of this company's series "K" handbook. Every line and paragraph in the former work has been carefully revised with the idea of securing even greater exactness than before and in the hope of answering practically all questions that might arise in the mind of the prospective customer or user. In preparing the text it has been kept in mind that one reader may be an important consulting engineer versed in every detail of electrical development, while another may be a switchboard attendant or operating engineer, looking for information to enable him to become a more skillful or economical operator of the power plant or factory committed to his charge; the hope of the company is expressed that this handbook will be useful to both alike. 260 pages; size 6 in. by 9 in.

Westinghouse Employees' Store Proves Successful

Nearly a quarter of a million dollars in cash sales was handled by the employees' store of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., in the first five and a half months of its existence. According to a report just issued by J. E. Bonham, secretary-treasurer of the Co-operative Buying Committee of employees, the total sales amounted to $226,673.02. After expenses for the period were deducted there remained a surplus of $11,550.90, which is being used as a working fund. The employees' store has been in operation since October 18, 1919, selling merchandise practically at cost to workers. It is the intention to enlarge the capacity of the store as the patronage of the employees warrants. Business was transacted in grocery, tailoring, shoe and miscellaneous departments, more than nine-tenths of the total sales being made by the grocery department. The tailoring department sales totaled $8,112.91, the shoe department sales were $6,341.85, and $9,665.57 was obtained in sales of miscellaneous goods.

Death of Mr. L. O. Horner

Mr. L. O. Horner, late manager of the supply department of the Canadian General Electric Company at Toronto, Ont., died on the 7th of June from septic poisoning, after an illness of one week. Mr. Horner, who had been with the firm twenty-two years and as manager of his department since 1915 had already established a splendid record for efficient management and aggressive business methods. He was exceptionally well liked by his colleagues and subordinates and will be very much missed by all who knew him whether among his business or social friends.

The late Mr. Horner

The Delta-Star Electric Company are distributing Special Publication No. 93, illustrating Unit Type outdoor high tension sub-stations for industrial service. Copies of this publication will be sent upon request.

Current News and Notes

Brantford, Ont.

Messrs. Webster Electric Co., 211 Colborne St., Brantford, Ont., have been awarded the contract for electrical work on 12 residences to be erected on Sheridan and Maitland Sts., Brantford.

Brunkild, Man.

Claydon Bros., Furby Place, Winnipeg, Man., are the general contractors for the new school at Brunkild, Man., and will sub-let the electrical work.

Cote St. Paul, Que.

Tenders will be called shortly for electrical work on the new Roman Catholic church to be erected on Monk Blvd. Cote St. Paul, Que., at a cost of $200,000.

Cobourg, Ont.

Messrs. Langslow Fowler Co. have awarded the contract for the electrical work on their new factory at Cobourg, Ont., to Mr. Harry A. Black, Cobourg, Ont.

Edmonton, Alta.

B. L. Perry, 10033 102nd St., Edmonton, Alta., has been awarded the contract for the electrical work on the new nurses home on 112th St., Edmonton.

The Hillas Electric Co., 10823 Jasper Ave., Edmonton, Alta., have been awarded the contract for the electrical work on the new press building of the Edmonton Journal, Telger Block, Edmonton.

Grand Mere, Que.

The contract for electric motors to be installed in the grinding room of the Laurentide Co. Ltd. factory at Grand Mere, Que., has been awarded to the Canadian Westinghouse Co. Ltd. Hamilton, Ont.

Hamilton, Ont.

Sub-tenders are called for the electrical work on the new theatre to be erected on King St., Hamilton, Ont. Architect, Thos. W. Lamb, 39 Adelaide St. W., Toronto, Ont.

Halifax, N. S.

Messrs. Farquhar Bros. Ltd., Barrington St., Halifax, N.S., have been awarded the contract for electrical work on the additions to the Victoria General Hospital, Halifax.

Ingersoll, Ont.

W. R. Bowley, 60 Dundas St., London, Ont., has been awarded the contract for electrical work on the new school at Ingersoll, Ont.

Kingston, Ont.

The demand of the electrical workers of Kingston, Ont., for increased wages has been settled by a Board of Arbitration. Journeymen electricians are to receive 70 cents an hour, have four years' qualification, and be at least twenty years of age; junior journeymen will receive 50 cents an hour, have three years' qualification, and be eighteen years of age. Helpers must have one year's qualification.

L'Assomption, Que.

Tenders are called for electrical work on the new boys college at L'Assomption, Que. Architect J. Turgeon, 55 St. Francois Xavier St., Montreal, Que.

Montreal, Que.

Messrs. Church & Ross Co. Ltd., 10 Cathcart St., Montreal, Que., general contractors for the additions to the factory of the St. Lawrence Sugar Rfns., Ltd., Montreal, will sub-let the electrical work.

Messrs. McDoval & Pease, 511 St. Catharine St. W., Montreal, engineers for the new Bovril Ltd. factory on Van Horne St., Montreal, will let the electrical work, shortly.

The Montreal Tramways Co., 78 Craig St., Montreal, suffered the loss of a car shed by fire recently. They will rebuild.

A. G. Norseworthy, 304 University Ave. Montreal, Que., architect for the new offices being erected on the corner of Jurors and Hermine Sts., Montreal, wants prices on the electrical work.

The City & District Savings Bank, 176 St. James St., Montreal, Que., are making extensive alterations to their office building on St. Catharine St., Montreal. They will let the electrical work.

J. Atsalinos, 105 Dorchester St. W. Montreal, P.Q., general contractor for the new theatre on Papineau Ave., Montreal, will sub-let the electrical work.

Moncton, N. B.

The Atlantic Underwear Co. Ltd., Moncton, N.B., are erecting a boarding house on Church St., Moncton, and have awarded the contract for the electrical work to J. W. McCarthy, 202 St. Georges St. of that city.

Tenders are being called by the Record Foundry & Machinery Co., Lutz St., Moncton, N. B., for the electrical work on their new foundry at Moncton.

Narol, Man.

F. F. Kroegel, East St. Paul, Man., general contractor for the new school at Narol, Man., wants prices on electrical supplies.

Ottawa, Ont.

The electrical work on 10 residences at Lindinela, Ottawa, Ont., has been let to M. Ladoeceur, c/o Bethell Bros., Westboro, Ont.

Outremont, Que.

The town council of Outremont, Que., contemplate spending $40,000 for the purchase of the overhead wire system in the town and replacing it by underground conduit.

Quebec, P. Q.

The electrical work on the new factory of the Parisian Corset Mfg. Co., St. Valier St., Quebec City, will be let by the owner or the architects, Messrs. Stavely & Stavely, 92 St. Peter St., Que., P. Q.

The Quebec Railway, Light, Heat & Power Co., 229 St. Joseph St., Quebec, P.Q., are contemplating extending their car line from Levis Ave. to Belmont cemetery, at a cost of $100,000.

Regina, Sask.

The Sun Electrical Company, Ltd., of Regina, Sask., have secured the electrical contract for work on the Weyburn Mental Hospital at a price of $79,000. This covers a main switchboard, transformers, all lighting power, wiring, electric fixtures and electric cooking apparatus. They have also been awarded the contract for electrical work on the new power house at the parliament buildings, Regina, Sask.

Richmond, Que.

W. G. Longe, Richmond, Que., is calling for tenders for the electrical work on his new restaurant and [illegible] house.

Sherbrooke, Que.

J. H. Bryant, Sherbrooke, Que., is erecting a new bottling factory and will let the electrical work.

Sudbury, Ont.

P. Morrison, Durham St., Sudbury, Ont., has been awarded the contract for the electrical work on the additions to the Elm St. school, Sudbury, Ont.

St. John, N. B.

The St. Stephen Electric Light Co., St. Stephen, N. B., have been granted permission to increase their rates, for twelve months, when the matter will again be discussed.

The Vaughan Electric Co. Ltd., 94 St. Germain St., St. John, N.B., have been awarded the contract for electrical work on alterations to the King St. Branch of the Standard Bank of Canada, St. John.

Messrs. Jones Bros., 124 Germain St., St. John, N. B., have been awarded the contract for electrical work on 10 residences at Lancaster, N.B. Also for 10 residences at Fairville, N. B.

Thornbury, Ont.

The Thornbury Electric Lighting Co., Thornbury, Ont., will rebuild the power house and replace the plant recently destroyed by fire.

Toronto, Ont.

The Toronto Hydro-electric Commission are calling for tenders for a new sub-station on Ossington Ave., Toronto.

The contract for electrical work on 6 stores and apartments on St. Clair Ave., Toronto, Ont., has been awarded to the Fred Armstrong Co. Ltd., 273 Queen St. W. Toronto.

The Automatic Telephone & Time Recorder Co. Ltd., 140 Victoria St., Toronto, Ont., have received the following contracts: Northern Aluminum Co., Sterling St., Toronto, 100 line system. Mutual Life Assurance Co., Waterloo, Ont., 100 line system. They are both Chicago Automatic Systems.

The Hydro-electric Commission of Ontario has recently decreased the rates of twenty municipalities and increased those of twenty-seven municipalities. They are all in the Niagara district.

Messrs. Richardson & Cross, 79 King St. E. Toronto, Ont., have been awarded the contract for wiring the new bank building on the corner of Cherry & Villin Sts., Toronto.

Messrs. Bennett & Wright Co., 72 Queen St. E., Toronto, Ont., have been awarded the contract for wiring the vault building of the Canadian Bank of Commerce, 98 Atlantic Ave., Toronto.

Messrs. Ramsden & Roxborough, 27 Wellington St. E. Toronto, have been awarded the contract for electrical work on the new bank building at 12-16 King St. W. Also the contract for wiring the new addition to the King Edward Hotel.

Three Rivers, Que.

The St. Maurice Lumber Co., Three Rivers, Que., are erecting 8 terraces of houses and have awarded the electrical work to P. Rochon, 84 Royale St., Three Rivers, Que.

Vancouver, B. C.

The Dominion Canners, Ltd., have taken out a permit for the construction of a power station at the corner of Homer and Drake streets, Vancouver, B.C., to cost about [illegible]

Mr. Thos. Lamb, 39 Adelaide St. W. Toronto, architect for new office building and theatre on Seymour St., Vancouver, B. C., will accept tenders for the electrical work.

Winnipeg, Man.

Mr. Scantlebury, resident engineer of the Winnipeg Marconi Co., and Mr. F. Barrow of the Montreal Marconi Co., have recently conducted successful experiments in wireless telephony, speaking to each other from the Kelvin St. school and the Manitoba government telephone supply depot, both in Winnipeg. Further tests are being conducted.

Messrs. Carter-Halls-Aldinger Co., Union Bank Building, Winnipeg, Man., general contractors for the new bank on the corner of Portage and Arlington Sts., Winnipeg, will sub-let the electrical work.

Windsor, Ont.

Messrs. Bennett & Wright, 72 Queen St. E., Toronto, Otn., have been awarded the contract for the electrical work on the new theatre at Windsor, Ont.

Woodstock, Ont.

Messrs. Harvey Knitting Co., Wilson St., Woodstock, Ont., are making additions to their textile plant and will let the electrical work.

Hydro Commission Loses Mr. Strickland

Mr. H. F. Strickland has resigned the office of chief electrical inspector of the Hydro-electric Power Commission of Ontario which he has filled for the past eight years. Previous to that he was for about the same period chief of the Electrical Department of the Underwriters Laboratories. Mr Strickland will probably open an office as consulting engineer in which position he could offer the industry the benefit of the splendid experience gained during fifteen years of closest contact with electrical installations of every kind.

Appointed to Head Office

Mr. A. Dwight Smith, district sales manager Northern Electric Company, Montreal, has been appointed to the General Sales Department at head office. Mr. Smith has had a varied experience with the company, joining it at Winnipeg in 1908 as salesman, and transferred to Montreal in 1909 on special railway work. In 1915 he represented the company at Ottawa specially on their war work, and in September, 1916, was made manager of the Ottawa office, being transferred back to Montreal as district sales manager in September, 1917, which office he has held until his recent change. In his new position he will have supervision over sales to railways, marine and shipbuilding concerns and fire alarm in the Dominion. Mr. Smith is a young man of pleasing personality, a good listener and an efficient director of the kind of sales that build up institutional prestige. He is succeeded as Montreal district sales manager by Mr. N. S. Richards, who has been sales manager at Calgary for the past three years.

Mr. A. Dwight Smith

ANNOUNCEMENT

ENAMELLED WIRE

We are pleased to announce that, at the request of a number of customers, we are installing a complete equipment for the manufacture of Enamelled Wire which we plan to have in operation by the end of May.

As this is a new departure as far as Canada is concerned we are sparing no expense to ensure this material being manufactured as well as is known to the Art.

Eugene F. Phillips Electrical Works
Limited

Head Office and Factories - MONTREAL

ELECTRICAL EQUIPMENT EXCHANGE

Used Machinery Sold - - - - Technical Positions Filled

Advertisements under "Situation Wanted" or "Situation Vacant" are charged at two cents a word per insertion, minimum charge 50 cents.

Advertisements for tenders, equipment, wanted or for sale, etc., or miscellaneous, are charged at $2.80 per inch.

All advertisements must be in the publisher's hands by the 10th or 23rd of the month to insure insertion in the subsequent issue.

TRANSFORMER DESIGNER WANTED for Sydney, Australia. State age, experience and salary expected. Expenses paid. S. N. Clarkson, 1570 Old Colony Bldg., Chicago. 12

WANTED—Second-hand generator as follows,—3 phase, 60 cycle, 600 volt, 514 R.P.M., capacity about 125 to 175 K.W., with direct connected or belted exciter. Price and full particulars to R. S. Kelsch, Power Building, Montreal, Que. 11-15

WANTED: Experienced Electrical Motor Salesman in A. C. and D. C. Electric Motors. Permanent position for man with good record in selling. Prefer someone experienced in electrical equipment such as installing motors, generators, [illegible] and millwright work.

Give full particulars, stating salary, references, nationality, when available. Out of the [illegible] Box 274, Electrical News, Toronto. 12

Superintendent of municipally owned hydro-electric power, light and railway system, desires [illegible] position [illegible] or industrial company preferred. Possesses technical and commercial training [illegible] operation and [illegible] with power, mining and smelting, and industrial companies.

Lowest salary considered Thirty-[illegible] Hundred Dollars.

Apply Box 277, Electrical News. 12-14

Wanted

Two first class erecting engineers to take charge of erection in Canada, of large water wheel driven Generators, Transformers and Switchboards; also High Tension Station Wiring, etc. None but experienced men need apply. Men with some technical training preferred. Mail full particulars, giving age, also salary expected, to Box 266, Electrical News, Toronto. 11-12

Wanted

ARMATURE WINDER - A. C. and D. C. Motor, various sizes and makes. General repair work. Scott Bros. Electric Company, Windsor, Ont. Main office: Detroit, Mich. 12

Small Motors

100—1/10 H.P., 110-Volt, 1600 R. P. M., General Electric, slightly used, in perfect condition. Will send sample upon request.

CARROLL ELECTRIC CO.,
12 Washington, D.C.

Idle Equipment

[illegible] operation is less than the cost of rust, dust, damage and the theft of small parts that disused equipment suffers.

One or two dollars spent in the "Electrical News" will get you a buyer. 12-t.f.

For Sale

Two 50 K.V.A., 25/60 cycle, single phase, C. G. E., type H. Transformers. Primary, 2200, Secondary 110/220/440/550 with Scott connection and standard taps.

HENRY ENGINEERING CO.,
12 71 Bay Street, Toronto

Civil Service Commission of Canada

Applications are invited from persons possessing the necessary qualifications for the position of

Junior Radio Electrical Engineer or Junior Electrical Engineer

in the Radiotelegraph Branch of the Department of the Naval Service at a commencing salary of $1,680 per annum, rising by annual increments of $120.00 to $2,040 per annum. Also Cost of Living Bonus as authorized by law.

Qualifications required:—Education equivalent to High School graduation and either, 1. Graduation in electrical engineering from a school of applied science of recognized standing with two years of experience in Radio Telegraph or Electrical Engineering work or, 2. Four years of experience in Radio Telegraph or Electrical Engineering work; supervisory ability, good hearing. Preference will be given to applicants with Radio Engineering experience.

Applications must be in the handwriting of the persons applying (or if otherwise the reason therefor to be given) and on forms supplied by the Commission, which may be obtained at any Post Office or from the Secretary of the Civil Service Commission, and are to be mailed to the Deputy Minister, Dept. of the Naval Service, Ottawa, immediately.

Length of residence in the locality must be stated. Applicants must describe the position as indicated above and must not vary description in making application.

In considering applications, preference will be given to persons who have been on active service Overseas in the recent war, in the Military or Naval Forces of His Majesty or of any of the Allies of His Majesty, who have left such service with an honourable record, or who have been honourably discharged. Returned soldiers must produce their Discharge Certificates or a certified copy of the same.

(Signed) W. FORAN,
12-13 Secretary

Western Canada Business

In position to handle Winnipeg and Western Canada few good lines exclusively. Apply Box 236, Electrical News, Toronto, Ont. 10-15

Technical Control of Filters in Ohio

Ohio has fifty-one filter plants with a total daily capacity of 502,000,000 gal. Twenty-one are under constant supervision of a technical superintendent, twenty-two have intermittent technical supervision and eight have no technical supervision or analytical control. The State Board of Health, according to W. H. Dittoe, chief engineer, in a paper before the American Public Health Association, received reports from 47 of the plants including four of the last class. The eight plants which receive no technical supervision vary in daily capacity from 100,000 to 800,000 gal. Of the nine disinfection plants, eight are under supervision with analytical work to check efficiencies.

The experience of the Department in connection with the control of operation of water purification plants has led to the adoption of certain guiding principles which are as follows:

1. Every filtration or disinfection plant should have some degree of technical supervision, and filter plants having capacities of 1,000,000 gal per day or more should be under daily technical supervision. The superintendent of filtration, whether employed constantly or intermittently, should be given full authority over the plant and other plant employees. As the problem is principally plant operation and maintenance, the employment of an analyst to examine samples and act in a merely advisory capacity does not provide efficient supervision.

2. The superintendent of filtration should be qualified by training in water supply engineering, chemistry and bacteriology, and, when employed for the larger plants, should have had experience in the operation of a smaller one. In rare instances it is possible for a man to become qualified by experience without fundamental technical training.

PETRIE'S LIST

of NEW and USED

MOTORS

No	H.P.	Phase	Cycle	Volts	Speed	Maker
1	60	3	25	550	750	Cr.-Wh.
2	52	3	25	550	720	Lancashire
1	35	3	25	550	720	Westg.
1	30	3	25	550	1500	Tor. & Ham
1	25	3	60	220	720	Cr.-Wh
1	20	3	25	550	750	Chapman
1	20	3	25	550	720	Westg.
1	15	3	25	550	1450	Westg.
1	15	3	25	550	1400	Lancashire
1	15	3	25	550	750	Lincoln
2	15	3	25	550	720	Westg.
1	11	3	25	550	725	Union
3	7	3	25	550	725	Westg.
1	5	3	25	550	750	Cr.-Wh
2	3	3	25	550	1425	Lancashire
2	3	3	25	550	1400	Westg.
3	2	3	25	550	1425	Lancashire
1	1	3	25	220	1500	T. & H.
1	1/6	1	60	110	1150	H. & C.

5-500 c.p. incandescent lamps with hanging sockets and 12" frosted globes

Write Us for Prices

H. W. PETRIE, Limited

Front St. West - Toronto, Ont.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - 296 Broadway
CHICAGO - - Room 803, 63 E. Adams St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50 Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, July 1, 1920 No 13

Good Progress Being Made in Meter Design

One of the most difficult problems of the supplier of electric current has always been the lack of a satisfactory form of metering instrument and while it is improbable that the ideal will ever be attained it looks as if good progress is being made. An apparently insurmountable difficulty lies in the fact that it is not so much the amount of energy the customer demands nor the amount of energy it is necessary for the central station to generate in order to meet that demand as it is the circumstances surrounding the supply, the time of day, the class of apparatus to be operated, the degree of continuity of the demand, and so on. The discussion on the Lincoln paper as regards metering the customer's load was all too short. Professor Herdt pointed out once more the limited function of the watt meter. If the actual effect of the customer's load is to be considered we must work towards the manufacture of a kv.a. hour meter. This, however, would not take into consideration the maximum demand of the customer and as Professor Herdt pointed out the ideal system of measurement must take note of both the total kw. hours and the maximum kv.a demand.

Mr. Lincoln's viewpoint is that the customer should pay not so much for what he gets as for the expense it puts the central station company to to supply him. This in effect is regulated by the heating effect on the central station equipment and so he advocates a meter based on the thermal effect of the energy supplied.

The Lincoln thermal demand meter has certainly advanced the art of measuring the consumer's load a big step. Engineers will look forward to the kv.a. meter which he predicts will be placed on the market at no distant date.

Help Cut High Costs by Standardization

In line with the urgent necessity seen on every hand for greater economies and efficiencies in all lines of business, the electrical industry seems to have set itself in line for commendation by taking up seriously the question of standardization. At the recent Niagara Falls convention of municipal engineers, the adoption of a standard wall plug and receptacle was strongly endorsed. This same principle may well be extended to the attachment plug at the appliance end of the cord, so that one cord, instead of many cords, will operate all the different appliances in the home. At the Montreal Convention one of the members spoke of standardization of their distribution voltage over a large area, their transformers and other equipment. He also mentioned the one little item of crossarms, pins, etc., where formerly his company kept a dozen different sizes which were now reduced to one. In consideration of the further fact pointed out by one of the committee reports that the overhead burden on an electric plant is now about four and a half times what it was in 1914, that the cost of materials has increased all the way from 100 to 335 per cent. and that the cost of labor has increased about 100 per cent., the urgency of standardizing to any reasonable limit is made doubly evident.

Power to New York and Washington From St. Lawrence

At a recent meeting of the American Institute of Civil Engineers, Mr. Percy H. Thomas, authority on long distance transmission, urged the construction of super-power stations to generate electric energy to supply Boston, New York, Philadelphia, Washington and intermediate cities. To achieve this, he suggested that electric energy be obtained from the Cedar rapids of the St. Lawrence and that "super power" plants be erected at the anthracite and bituminous mines of Pennsylvania. The scheme is of particular interest to Canada, as the proposed market could readily absorb all the power produced by the Long Sault as well as the surplus from Cedar rapids.

In presenting the scheme, Mr .Thomas stated that the most important advantages of the project are the conservation of coal and the relief of railways from the burden of hauling it. To conserve fuel most effectively requires both the development of as much waterpower as may be economically justified and the burning of coal in the most economical manner, as well as the use of low grades of coal.

The proposed system consists of a main 250,000-volt line, connecting Washington with Boston, via Baltimore, Wilmington, Philadelphia, Newark, New York, New Haven and Providence. This line would be fed from two groups of large stations at the nearest bituminous and anthracite coal-fields. Each group of such powers would feed the main line through a tap line, approximately 150 miles long. The energy generated in the suggested large plant or group of plants on the St. Lawrence river would feed the main line by another tap line of about 250 miles long which would connect with the main line probably where it crossed the Hudson river. The total distance from Cedars to New York would be about 300 miles.

Are Switches on Washing Machines a Hazard?

In our last issue we reproduced a letter from Mr. F. A. Cambridge objecting to the use of switches on washing machines as introducing an unnecessary hazard. As the arguments did not all appeal to us as being on one side we drew the letter to the attention of some of our readers who wrote us as follows:

Editor, Electrical News:

On account of its accessibility, a switch on a washing machine is a great-convenience. If it is properly installed and correctly connected and securely grounded, such a switch need not increase the risk. The above requirements would be met, in my opinion, by the following:

1st—A porcelain or composition switch in the case of a snap type switch, and in the case of a flush switch a metal box should be used.

2nd—Any single pole switch should be connected so that it will always open the ungrounded wire.

3rd—Any metal parts about the switch supports, including the box enclosing a flush switch, should be grounded.

In this province grounded secondaries are compulsory, and I believe advisable everywhere. When the secondaries are securely grounded the only risk, providing the above rules regarding the installation have been followed, is that in re-connecting the cord supplied with the washer, the lines might become reversed. This difficulty could be overcome by the use of a polarized receptacle.

In conclusion, I am of the opinion that Mr. Cambridge is drawing attention to a hazard which does not or need not exist, and I am in favor of having switches installed on washing machines for the reason stated at the beginning of the letter—greater convenience.

E. V. Buchanan,
General Manager
London Public Utilities Com.

Editor, Electrical News:

We certainly agree with the view points of Mr. Cambridge, and would like to suggest an addition, that all electric washers that are belt-driven or gear-driven, should have guards on same.

We know of an instance in Fort William where a little child had two of its fingers taken off by a belt-driven electric washer. The child inserted its hand between the belt and the pulley, which resulted in the sharp edges of the grooved pulley taking off two of its fingers. We believe that the same precaution should be taken with the electric driven washing machines as the machine shops or any other place where the factory inspector would condemn a machine exposed in this manner without proper guards and especially where it is being handled by inexperienced operators.

A. A. Mahon,
Mahon Electric Co.,
Fort William.

Editor, Electrical News:

I have not seen any washing machines equipped with switches as described in the letter of Mr. F. A. Cambridge, chief electrical inspector of Winnipeg, Man., and am therefore unable to express my opinion as I do not know the method employed by the manufacturers in installing these switches.

With the present method of attaching washing machine equipment to sockets, I consider the switch on a machine properly installed and with safe guards to cover the various points of danger outlined by Mr. Cambridge, would be much superior.

In our experience there has been what, in our opinion, is just as great a danger, and that is, in the ground of motor which will create just as much life hazard as a defectively installed switch. If it were possible to develop some easy means of grounding the entire machine, we think it would be a more satisfactory method.

Another suggestion is, that the various inspection departments insist on a separate switch and wall receptacle being installed for washing machines.

Mr. Cambridge has brought up some other good points in his letter, and I believe that if proper representations were made to the various manufacturers of washing machines, the installation of switches could be so safe-guarded that danger would be eliminated.

George J. Beattie,
Toronto.

Development of Lepreaux River

Plans for the development of Lepreaux River under the Water Power Act, passed at the last session of the New Brunswick Legislature, are being worked out. The general lay-out of the dams and plant at the Big Falls and the Lower Falls have been approved by Mr. Henry Holgate.

At the Big Falls, where there is a head of 100 feet, the plans call for the development of 2,250 horse power for a twenty-four hour day and 5,000 h.p. for a ten hour day. At the Lower Falls, where there is a head of 70 feet at low tide, about two-thirds of the power of the Big Falls is available. Up the river there is the Ragged Falls with a head of 90 feet, making for the three falls a total head of 260 feet.

At the Big Falls the dam would be about 600 feet long at the crest. This dam would give a bondage 6 miles long by an average breadth of 350 feet.

Shawinigan Company Issues 7½% Bonds

The Shawinigan Water & Power Company has sold to a syndicate composed of Canadian and United States financial houses an issue of $4,000,000 of 7½ per cent. six-year convertible notes. The proceeds of the issue are to be used during the current year and 1921, on the expansion and improvement programme already adopted by the Shawinigan executives. A second transmission line is to be built between Shawinigan Falls and Montreal in order to cope with the company's increasing demand for power, while a new unit of 50,000 horse power will be installed at the Shawinigan plant.

Hydro will Install 50,000 h.p. Steam Plant

The Hydro-electric Power Commission of Ontario have given instructions to their engineering staff to install a 50,000 h.p. steam plant at a point which is yet to be determined, in time for the winter load of 1921-22. This will be in two 25,000 h.p. units. At the present moment a number of Hamilton sites are being considered.

Mr. Charles W. Doane has been appointed Detroit representative of the Automobile Equipment Department, of the Westinghouse Electric & Manufacturing Company, 1109 Kresge Building, to succeed Mr. L. B. Fijux, who has resigned to become vice-president of the Turner Moore Company, of Detroit. Mr. Doane was for many years in charge of the Westinghouse Automobile Service Department for the Detroit district and is succeeded by Mr. A. B. Junker.

A party of delegates and their wives, numbering 150 in all, from the National Electric Light Convention, recently held at Pasadena, Cal., passed through Vancouver and Winnipeg on their way home. At Winnipeg they were entertained by the Board of Trade and the C. P. R.

Canadian Electrical Association Holds Thirtieth Annual Convention

Numbers of Valuable Reports Presented and Discussed—Constitution Amended so That Canadian Identity More Clearly Established—Montreal Upholds Its Reputation as a Lavish Host

The Thirtieth Annual Convention of the Canadian Electrical Association was held at the Ritz-Carlton, Montreal, on June 16, 17 and 18, a goodly number of members being in attendance. All the hotels in Montreal are crowded and the Ritz-Carlton was no exception. Overflow accomodation was provided, however, of the best summer cottage variety and everyone seemed perfectly well satisfied. Mr. A. Munro Grier, president of the association was in the chair, being relieved at brief intervals by Mr. E. A. Dunlop, first vice-president, and Mr. A. P. Doddridge, third vice-president of the association. Mr. P. T. Davies, second vice-president was absent in England.

Following the reading of the minutes of the previous annual meeting, and the report of the secretary-treasurer, Mr. William Volkman, the first day was given over to the reading and discussions of reports of various committees. These included a report of the Committee on Meters, by E. J. Turley, chairman; a report of the Committee on Prime Movers, by S. Svenningson, chairman; the report of the Committee on Electrical Apparatus, by J. E. Neild, chairman, read in his absence by the secretary-treasurer; the report of the Committee on Commercial Sales and Rates, by P. T. Davies, read in his absence by C. T. Barnes; report of the Committee on Accounting, by C. Johnston, chairman, and report of the Committee on Accident Prevention, by Wills Maclachlan, chairman. Reports were also made by representatives of N. E. L. A. Committees as follows; J. F. Neild, Electrical Apparatus Committee; P. Ackerman, Inductive Interference Committee; E. J. Turley, Meter Committee; A. A. Dion, Overhead Systems Committee S. Svenningson, Prime Movers Committee; L. A. Kenyon, Underground Systems Committee; George K. McDougall, Lighting Sales Bureau Committee.

Representatives on the Canadian Engineering Standards Association also reported as follows: J. F. Neild for the subcommittee on Transformers and George K McDougall for the sub-committee on Lamps.

The evening's entertainment consisted of an informal dinner in the Ritz-Carlton grill, to which the ladies were invited. An enjoyable entertainment was arranged by the Entertainment Committee, of which J. B. Woodyatt was chairman. The accomodation was limited to 150 and a number of disappointed delegates were unable to secure tickets.

Two brief addresses were delivered at the evening dinner, first by Mr. R. A. Ross, the official appointee of the mayor of the city of Montreal, who welcomed the delegates. Mr. Martin J. Insull, president of the N. E. L. A., also spoke briefly, curtailing his remarks on account of the evident eagerness of the members to begin their game.

Following the dinner, the tables were removed and Monte Carlo was staged, money to the extent of some $175,000 (wall paper variety), being supplied to such members as elected to take part in the game. Prizes were given to the two members finishing with the largest and the second largest sums.

For those who preferred dancing, the Venetian Gardens of the hotel were placed at their disposal. A very enjoyable evening was spent by everybody.

On Thursday morning the delegates enjoyed a treat in the form of an address by Mr. P. M. Lincoln, an ex-president of the A. I. E. E., and until recently associated with the Westinghouse Electric & Manufacturing Co. Mr. Lincoln is now associated with the Lincoln Electric Company and the Lincoln Meter Company. His address was on the subject "Metering the Customer's Load." His remarks and the illustrations which accompanied them are reproduced, in effect, in the June 15 issue of the Electrical News.

In the afternoon, the association were privileged to hear an address by Mr. Martin J. Insull, who spoke at some length on the work of the N. E. L. A. A paper on "The New Viewpoint on Modern Lighting" was also presented by Mr. A. R. Colville, of the National Lamp Works of the General Electric Company.

On Thursday evening the members were left to follow their own inclinations.

The Friday sessions were given over entirely to Class "A" executive matters. Among other things, it was decided to change the constitution along the lines indicated in our June 1 issue and so as to conform with the changes recently made in the N. E. L. A. constitution at their Pasadena convention. The officers for the ensuing year were also elected as noted below:

Mr A Monro Grier, K C , President, Canadian Niagara Power Co , President of the Canadian Electrical Association for the third consecutive term

Officers for 1920-21

The choosing of officers for the coming year resulted in the unanimous re-election, for the third time, of Mr. A. Monro Grier to the position of president. Mr. Grier was anxious to be relieved of the continued responsibility of so important an office, but the members were so urgent and unanimous that he felt compelled to accede to their wishes. Mr. Grier's presidential term of office has been attended with splendid results and as a presiding officer during convention proceedings he is incomparable. The remaining officers are as follows: P. T. Davies, first vice-president; A. P. Doddridge, second vice-president; L. W. Pratt, third vice-president; Eugene Vinet. secretary-treasurer. The executive committee includes the above officers and the following: A. A. Dion, J. B. Woodyatt, F. T. Kaelin, A. V. Gale, R. J. Beaumont. J. S. Norris, D. H. McDougall, C. T. Barnes.

Mr. Eugene Vinet, newly appointed Secretary-treasurer. Mr. Vinet saw active service in France, Belgium and Germany

The executive committee will also include four manufacturers' representatives. The companies named to elect representatives for the coming year were: The Canadian General Electric Company, The Canadian Westinghouse Company, The Northern Electric Company and The Lincoln Meter Company.

Report of Meter Committee

How Often Should a Meter be Tested? — Uniform Disc Constant

Mr. Turley, chairman, read the report of the Meter Committee. The other members included Messrs. A. A. Dion, E. S. Gregory, A. H. Winter-Joyner, L. W. Pratt, E. R. Spence and William Volkman.

The report dealt with the length of time a meter may remain in commission without requiring inspection. A number of member companies had been asked to report on their own experience, and the unanimous opinion had been that meters of the latest design, that is designed since 1910, were found to be accurate at the end of five years, with the exception of about 1 per cent., which fell outside the Government accuracy requirements. The question, therefore, naturally arose whether the period may not be extended to eight, nine or ten years, or approximately double what it is at present.

The committee expressed it as their opinion that if this practice were adopted for testing the meters in situ, the expense would be reduced as well as the breakage of a large number of jewels, which is often the case under the present system of transportation.

The committee also reported on the question of a uniform disc constant for all integrating watt hour meters and expressed the opinion that it is an important consideration and one that should be taken up by the manufacturers in the near future. The constant suggested is based on .25 watt hours for every 550 watts of meter capacity, the constant to be in terms of watt hours, that is, a 5 ampere meter operating on 110 volts would be so constructed that for every revolution of the disc the meter would register .25 watt hours, which means that the speed of the meter would be 33-1/3 revolutions per minute.

The report briefly mentioned the fact that the Lincoln Demand Meter, as also the General Electric Company's type M.7, had been submitted to the committee during the year for inspection. The Lincoln meter is a kilowatt demand meter which measures the heating effect on the equipment.

Another matter which the report mentioned was the advisability of adopting in Quebec a law similar to the one in Ontario, which requires the sealing of fuses on the inlet to the meters.

Discussion

The paper was discussed by Messrs. Lyons, Coulter, Turley, McDougall, Pratt, Doddridge and others. It appeared to be the general opinion that the Government period of five years, at the end of which a meter must be submitted for test, was too short, and that this might safely be increased to eight or ten. The question of the sealing of fuses was not considered as meeting the requirements expected of it. Some of the member companies spoke of a considerable amount of theft of current which they thought the seal might prevent. However, it seemed to be the general opinion that a penalty clause, such as they have in Montreal, under which a customer may be summarily fined by the company if he is guilty of theft, was probably the most satisfactory basis of operation. In any case, even if a law were enacted requiring the seal, it would not be well to do away with the privilege of imposing the fine.

Report on Prime Movers

Forty Thousand Horsepower Water Turbines—Automatic Control Increasing in Favor

The Report of Prime Movers was submitted by S. Svenningson, chairman of the Committee, the other members being Messrs. Alex. Wilson and A. Trimmingham. The report covers steam and hydraulic turbines, as well as oil engines, but, in view of the importance of hydro-electric developments in Canada, more time was devoted to hydraulic equipment.

In steam power units the present day tendencies are still towards higher pressures and temperatures, the concentration of power, and larger unit capacity. Owing to the high price of fuel, the efforts of the manufacturers have been directed to the development of turbines along the line of economy.

The report pointed out that a Diesel engine had been built during the last year with a capacity of 520 B.h.p., 4 cycle, and as high as 3,300 B.h.p., 2 cycle. The fuel consumption of Diesel engines is now guaranteed at .4 to .5 lbs. per horse power per hour at full load, and .5 to .6 lbs. per horse power per hour at half load. This represents a thermal efficiency of 34 per cent.; that is, about one third the consumption of an oil fired steam plant of the same size.

Hydraulic Turbines

Water wheels have been installed up to 40,000 h.p. and there are indications that the limit has not yet been reached. Higher efficiency is obtained from such installations, one reporting an over-all efficiency of 90 per cent., reckoning from the mechanical energy of the water to the electrical energy on the bus-bar. The present tendency is towards the use of vertical turbine units. A new type of high speed runner has been developed which will be useful in plants of low head. There is a tendency to erect the generating units outdoors, housing only the control apparatus. Manufacturers report a continued tendency to install automatic hydro-electric plants.

Wheels have been constructed with the speed rings designed so that hot water can circulate in them and on through the guide veins so as to prevent the formation of frazil ice. There has been much discussion on the ice problem, the general opinion being that these difficulties can, to a large extent, be overcome by (1) drowning out the rapids above the power site, (2) locating the development so that prevailing winds tend to drive the ice away from the fore bay, (3) heating the racks and runners slightly above the temperature of the surrounding water, (4) keeping a careful log of weather and ice conditions and of their relation to one another.

The report contains a number of letters received from members, advocating closer co-operation between the Canadian Electrical Association and the National Electric Light Association, so as to obviate duplication of work by the various committees.

A number of statements from various manufacturers were included, giving, in brief outline, the developments in their special equipment. These included statements from the Canadian Westinghouse Co., the General Electric Co., the Bolinders Co., the Wm. Cramp & Sons Ship & Engine Building Co., the Wellman-Seaver-Morgan Co., the Allis-Chalmers Mfg. Co., Prof. C. M. Allen, Worcester Polytechnic Institute.

Report on Electrical Apparatus

Grounding Neutral in 3 ph. Systems—Fire Hazard in Transformers—Telephone Developments

In the absence of Mr. J. F. Neild, the report of the Electrical Apparatus Committee was presented by Mr. J. S. H. Wurtele. Other members of the committee in addition to Mr. Wurtele were Messrs. W. H. McIntyre, C. J. Porter and M. J. Schwegler. The report pointed out the condition which exists in many plants today, namely, the demand for an abnormal amount of reconstruction and extension work due to economies practiced during the war. Having this condition in view, the committee urged the consideration of the member companies in working towards standardization. The different standards of service voltages, for example, require manufacturers to design comparatively heavy stocks of various devices.

A question that recently has created discussion is the method of excitation in large public utilities. The general trend is towards an individual source of excitation for each unit. In some cases the excitors are mounted directly on the end of the generator shaft. In others, the exciter is turbine or motor driven. Individual conditions must determine which is the best arrangement.

Until recently, it has been the common practice to operate the control system from the excitation fuses, but in many larger plants these are now being separated.

The report introduced a discussion on the grounding of the neutral in 3-phase systems, which, it notes, is rapidly becoming standard practice for both 25 and 60 cycles. The question was raised as to whether it would be better to ground solid or through a resistance.

The automatic sub-station is rapidly forcing itself on the attention of engineers. A great increase in operating cost, due to higher wages and shorter hours, the increasing value of real estate and excessive taxes, all contribute to the need of automatically operated stations. While it is unlikely that automatic operation will become universal, the equipment has now reached a stage when its success, over widely varying conditions, has been fully demonstrated.

In the line of the automatic type sub-station general progress is noted. Transformers for outdoor service up to 12,000 kv.a. are now obtainable and the recent purchase of two transformers of 10,000 kv.a. capacity, 27,600/110,000 volts, 3-phase, self,cooled with complete switching equipment for outdoor service is reported.

The question of the relative fire hazard of air blast and oil immersed transformers had been raised before the sub-committee of the N. E. L. A., but it did not appear that any great danger existed in either case. Probably not more than a dozen fires have occurred to air blast transformers and all of these were older types. In the oil insulated types it must be remembered that oil is not easily combustible and may readily be controlled by modern extinguishers. The report states, therefore, that no unusual fire hazard attends the use of oil filled electrical equipment.

The interruption capacity of oil circuit breakers is attended with uncertainty and the report makes the request for certain data which the member companies might furnish out of their operating experience. If this information is forthcoming, the Electrical Apparatus Committee should be able to prepare an interesting report on this subject a year hence.

Considerable space is given over to the developments in telephone work, particularly as regards the automatic exchange. The Bell Telephone Company have so far perfected their apparatus that the work of manufacturing it is already well advanced and the first automatic equipment will be placed in service early in 1921.

Discussion

An interesting discussion followed the reading of this report. Mr. Wills Maclachlan pointed out that the fire extinguisher called "Fomite" would give better results than Pyrene in putting out an oil fire. Mr. P. M. Lincoln expressed his belief in the grounding of neutrals of 3-phase transformers, though whether through a resistance or not would depend on the objects such grounding might have in view. Mr. A. P. Doddridge referred to a legal case in Quebec, where the company had been held liable because their equipment had not been properly grounded when a fire occurred. Mr. J. S. Gould described an incident in the operation of the Rideau Power Company's plant, where he believed the grounding would have prevented trouble.

Report on Overhead Lines

Standardization of Equipment—Rubber Gloves—Best Wood for Cross Arm Pins

Mr R J Beaumont presented the report of the Committee on Overhead Lines. He reported that during the year he had been engaged in standardization work for the Shawinigan and associated companies, and, as the result of work done, a handbook had been printed and issued among the engineers and operating men of these companies, covering the standardization of overhead construction in cities and towns and also covering transformer standardization from the distribution type to practically the largest type. The result of this work of standardization notably affected the quantity of material to be carried in store. For instance, taking the case of the four pin cross arm, which was formerly carried in the stores in about 12 different sizes, this size has now been brought down to one, and the same story of economy has been brought about in the case of bolts, braces, and other materials.

Another advantage of standardization in such a system is that it controls the type of construction to be used in specific cases, and removes from the foremen and local superintendents the onus of using their own discretion as to design.

Mr. Beaumont reported regarding the question of standardization of transformers, that his company had adopted 2,300 volts as the standard distribution voltage. He stated that they were particularly interested in the question of polarity of the distribution type of transformer, being strongly of the belief that it should be subtractive instead of additive. Referring to the rubber glove specification authorized by the Association last year, Mr. Beaumont reported that Canadian manufacturers were very reluctant to meet these requirements, and, if it were necessary to stand by them, it would not be possible to make the purchases of gloves in Canada.

An interesting discussion followed the reading of this paper, in which Messrs. Gale, Gurley, and others took part. The experience of a number of delegates, regarding the best material to use for cross arm pins, was given, one of the members expressing the definite opinion that elm was the most satisfactory.

Commercial Sales and Rates

Electric Ranges a Doubtful Load—Value of Advertising—Seasonal Loads to Fill the Valleys of the Load Curve

This Committee was composed of Messrs. P. T. Davies, Chairman, Chas. T. Barnes, M. C. Gilman, S. T. Halls, R. B. McDonnough, W. H. McIntyre, L. W. Pratt, J. B. Woodyat.

The report makes more or less detailed reference to electric ranges, water heaters and electric household appliances generally; brass furnaces; off-peak loads seasonal loads and surplus power contracts; power-factor.

The use of electric ranges, water heaters and appliances in general was discussed from two angles. From the viewpoint of the consumer there can be no question but that such equipment is highly desirable. It is not quite evident, however, that it is a profitable load for the central station under all circumstances, and the Committee state that they hesitate somewhat to either definitely advise for or against the encouragement of such loads. A number of figures are quoted showing that the cost of electric cooking, for example, is no greater, and frequently less, than the cost of doing the same operation using gas or coal, in addition to which there are many special benefits following the use of electricity. The question resolves itself into this, therefore—will the capital investment required to supply this type of load be so great as to prevent profitable return to the company, and, if so, to what extent should the consumer be asked to contribute to this capital investment?

It is pointed out that the load-factor of the individual electric range is about the same as that of the lighting installation in the same residence. The cooking load also has a high diversity factor, and an instance is cited of an apartment house in which there were 22 electric ranges, with a total connected load of 97.14 kw. where the combined maximum demand was only 16.8 kw., showing a diversity factor of nearly 6.

Some consideration is given to water heating, and it is pointed out that the most satisfactory manner of installing heaters is to use a double throw switch, so that the range and the heater cannot both be used at the same time. It is readily seen that this benefits the central station by lessening the possible demand, and is not likely to materially inconvenience the customer.

Attention is also given in the report to the application of electric heat in various industries. In the baking industry, electric ovens are being found very efficient. Hotels, restaurants, hospitals, and other institutions, are cooking electrically on an increasing scale for the reason that they find it profitable to do so. Japanning ovens are being electrically heated in the automobile industry, the manufacture of typewriters, etc. Core ovens in foundries are now being heated electrically, and large blocks of power are being required more recently for large treating furnaces in which cast steel anchor chains, crank shafts for airplane motors, etc., are electrically annealed.

Reverting again to the domestic application of electricity, the report points out that the present time is opportune for the development of this load. In the home the cost of practically everything has been raised—except electricity,—and, in addition to this, it is becoming increasingly difficult to obtain labor in any form. Where any central station is in a position to supply more customers, a judicious campaign of advertising is advocated, which, it is believed, will soon bring the station's load up to capacity. The fundamental principles underlying effective advertising are outlined at some length, and a few useful hints given on the preparation of advertisements.

Brief mention is made of the necessity of operating on some form of installment plan in the sale of the larger electric appliances, and it is advised that at least 10 per cent. should be added to the cash price under such circumstances, to cover the cost of collection, accounting, etc.

Regarding the sale of heaters, it is pointed out that the central stations are feeling the effects of the enormous sale of these appliances during the early autumn and late spring months, which threatens to bring the demand at these periods, say, in November and April, to a higher point than at any other season of the year. The heater load has not a high diversity factor, and so does not tend to fill the valleys of the load curve to the same extent as some of the other appliances.

Among the industrial applications of electricity particular mention was made of the electric brass furnace, which, it is estimated, might easily be developed so as to absorb a load of 160,000 kw. These furnaces are made in comparatively small units, and, from an electrical point of view, the load is a desirable one, having a high load factor without excessive peaks.

Advisability of Including Off-peak Clauses in Large Power Contracts

The report also deals with the advisability of including off-peak clauses in large power contracts, and central stations are urged to spend the necessary time required to analyze the operating conditions of the plants of large power consumers with a view to having incorporated in their agreements some restriction in the amount of electric energy that may be taken at the time of the company's peak load. The inclusion of an off-peak clause can generally be amicably arranged with the officials of the industries concerned if the power situation is intelligently explained.

Central stations are advised to be on the lookout for seasonal loads with which to fill up the valleys in their load curves. Among those mentioned are brick and tile making, which plants operate only in the summer months; there is also ice-making, pumping plants for irrigation purposes, the replacement of isolated plants in large industrial concerns whose use in the winter, where both heat and power are required, may be advisable, but which would probably be operated at a loss during the summer when the heating load is off, electro-chemical or electro-metallurgical industries; the water heating load in private residences, hotels, or public institutions, where the water is heated during the winter by coils from the furnace, would also prove a profitable summer load.

The question of penalizing customers for low power-factor loads was described in the report as having become a general practice, and rightly so. Examples are quoted to show how necessary it is that central station companies should be on their guard against the customer with very low power-factor. Taking the case of a load of 500 kv.a. with 80 per cent. power factor and 8 per cent. drop for a distance of one mile, it was shown that whereas the cost of equipment to supply this company five years ago was only $28.00 per kw. it is now $77.00 per kw., in addition to which has to be considered the new rating of apparatus on a 55 degree temperature rise as compared with a 40 degree rise five years ago. Several companies are now specializing in the supply of synchronous self-starting condensers for floating on the customer's lines, and there has recently been developed a static condenser which will take care of power-factor for loads up to 1000 kv.a.

Measuring Equipment Inadequate

The report briefly referred to the well recognized difficulty of accurately determining the effect of any customer's load on the central station system. Our measuring equipment is still inadequate, but the hope is expressed that the time may not be far distant when kv.a. and kv.a. hours will be the basis of billing, and 100 per cent. power factor will be required. The opinion is therefore expressed that in view of the fact that 85 per cent. of all costs in delivering electricity are fixed, it would seem almost time for companies to be paid for the capacity of apparatus used to supply the custom, and not for the horse power imposed on the water wheels by the customer's load.

Prof. Herdt, of McGill University, and Mr. P. M. Lincoln discussed the report briefly from the viewpoint of the present inadequate means available for determining the customer's load.

Report on Accident Prevention

Rubber Gloves, Resuscitation and Grounding — Specifications for Lineman's Belt

The Report of the Accident Prevention Committee was presented by Mr. Wills Maclachlan, chairman of the committee. The other members were Messrs. R. F. Hayward, L. A. Kenyon, J. T. Lambert, J. H. Martin, J. A. McSweeny, J. F. Neild, Eugene Vinet, and J. S. H. Wurtele.

The introduction pointed out the importance of conserving workmen, not only because the company suffers loss when a workman is injured and loses time, but also on account of the personal loss to the workman's family, which also frequently means a financial obligation to the Government directly or indirectly.

A detail report was presented which had been prepared by a sub-committee of members conversant with the safeguarding of hydraulic equipment in power plants.

Another detail report was submitted, covering the guarding of high tension apparatus. This report covered some of the more important points, containing suggestions for superintendents and designing engineers.

Special mention was made of the report of the N.E.L.A. Committee on accident prevention, which contained, among other things, detail information in connection with the apparatus used in the testing of rubber gloves. In this report there are also given fundamental rules for accident prevention which could be put into effect by a company with very little modification. The question of resuscitation had been discussed at length and a number of typical cases described, showing where the method was properly applied, and where a life might have been saved if certain things had been done. The question of "grounding" is drawn to the attention of the members, and a very complex index to the requirements of the National Electric Safety Code is presented. Other matters dealt with are: the lack of illumination around public utility plants; changing insulators on high tension wires while alive; testing high tension wires, replacement of nameplates, etc.

A detail report No. 3 was presented, which comprised specifications for a lineman's belt. Samples of this belt have been in use by various line gangs for something over a year and have been found very satisfactory. The men do not take kindly to them at first, but, having become accustomed to them, have uniformly endorsed them.

Suggestion was made that all accidents be reported by member companies to the secretary of the Association on specially prepared report forms. This would enable the Association to compile useful information.

One paragraph of the report dealt with the effect of the health of the employees on accident prevention and suggested the advisability of studying the relative amount of lost time due to sickness and to accident. During the year 1918 employees of one large public utility lost 7.2 days on the average on account of sickness; during 1919 the figure was 6.4 days each for the same utility. In a department having to do with construction maintenance and repair of overhead lines and inside equipment they lost 2.7 days each on account of sickness, and 1.9 days on account of accident. This would indicate that the fact of the work being outdoors, and therefore more healthy, might have reduced the number of days lost time. An example was quoted where co-operation in accident prevention had reduced the lost time in a utility from 2 days per man per year to .65 days per man per year. The report adds, "If this is possible in accident prevention, would it not also be possible, by co-operation and education, correct sanitary conditions and physical examinations, to very considerably lower the time lost due to sickness, and, at the same time, increase the efficiency of the employee while he is at his work?"

The effect the work on accident prevention may have in creating closer co-operation between the employer and employee was also touched upon. It is suggested that this co-operative feature might be extended to the study of other questions, such as wages, hours of work and working conditions of various sorts, and it is recommended to the executives that a careful study and investigation of this plan be made as a possible means of solving the difficulties that arise between employer and employee.

Reports of Representatives on N. E. L. A. Committees

Mr. J. F. Neild, as representative of the Electrical Apparatus Committee of the National Electric Light Association, presented a brief report, and drew attention to the necessity of obtaining definite data on the operation of oil circuit breakers. He also drew the attention of the members to the fact that all information and data of the N. E. L. A. Electrical Apparatus Committee is at their disposal, and that a great deal of information is thus easily available.

Inductive Interference

The Canadian Electrical Association representative on the Inductive Interference Committee of the National Electric Light Association, Mr. P. Ackerman, submitted a printed report of the whole committee, as presented at the recent N. E. L. A. convention at Pasadena. Mr. Ackerman pointed out that the Inductive Interference Committee was formed last year as a sub-committee of the Technical and Hydroelectric Section, chiefly in view of certain local controversies that had arisen in different parts of the country between telephone and power interests, in which it was felt that the power interests were not sufficiently familiar with the problems involved to protect their own interests. The committee has endeavored to collect technical and local data which will be of assistance to member companies, but it also tried to pave the way for mutual co-operation between the two interested parties. The report urged that member companies, who have not yet returned the questionaire which had been sent out should do so at the earliest possible moment, as it would greatly assist the work of the committee.

Underground Systems

Mr. L. A. Kenyon, the C. E. A. representative of the Underground Systems Committee of the N. E. L. A., reported on the most important items brought under discussion during the past year. The question of three-conductor versus single-conductor cable had been discussed and the conclusion reached that for voltages up to 25,000 the three-conductor cables were more economical. For voltages above this figure and for capacities larger than 10,000 kv.a. each problem must be worked out on its merits.

The temperature of cables for safe operations was also discussed, but on this point comparatively little reliable information was forthcoming and it was recommended that investigations be continued in the near future.

Regarding the material for ducts and the method of installing them, the opinion was expressed that reliance should not be placed on the material of which the duct was composed for preventing the arc from a burnt-out cable damaging a cable in an adjacent duct, but that a spacing of 1 in. of concrete should be placed between the ducts. It was also recommended that ducts entering a manhole should fan out vertically and horizontally so as to give greater spacing between the cables. The material to be used for ducts was recommended in the following order, (1) concrete;, (2) fibre; (3) single duct vitrified tile; (4) multiple duct vitrified tile; (5) iron pipe. The recommendation was also made that the lead sheathing of all cables be well bonded in each manhole and that all ducts be sealed to prevent the escape of gases.

The question of fireproof protection of cables in manholes was discussed and the committee decided that a concrete covering well laid forms the best arc resisting material. This should be, at least, ½ in. thick. Mr. Kenyon stated that he had always used asbestos webbing coated with water glass for this purpose and had found it very satisfactory.

The location of faults was by two principle methods, one, the so-called loop test, and the other, the inductive method. A number of companies also use the megger. The report pointed out that with any apparatus, a man with experience in testing is necessary.

A record of high tension cable failures has been compiled for some time and should eventually provide valuable data for the members.

A specification for P. I. L. C. cables, prepared in conjunction with the Transmission and Distribution Committee of the A. I. E. E., in conference with nine cable manufacturers, had been prepared and was attached to the report with the recommendation that it be adopted by Canadian cable manufacturers.

Light Sales Bureau

The representative of the Light Sales Bureau Committee, of the N. E. L. A., Mr. G. K. McDougall, made a brief report covering the activities of his committee. A movement had been commenced to get closer co-operation between fixture manufacturers and the lighting companies, with the result that the lighting fixture people, through their association, have asked for information which will assist them in designing and marketing fixtures that will produce efficient lighting without sacrificing the artistic effects. It is felt that this is the beginning of a movement which may well be instrumental in decreasing the great variety of fixtures and units now manufactured.

The Bureau has several divisions which had reported briefly to the N. E. L. A.

The division on Commercial Aspects of Lamp Equipment had collected a quantity of data on the latest lighting equipment and it was recommended that this be made available to everyone in the lighting field.

The division on Street and Highway Lighting had made a report calling attention to the demand for adequate lighting of highways. Reference was made to the decrease in percentage of accidents and data was given on recent investigations. Advantages of new methods of control and time switches were referred to.

The division on Store Lighting Reports covering suggestions for the lighting of small and large stores and show windows and emphasizes the fact that proper lighting assists in the sale of goods. The use of a lamp approximating daylight is recommended and some reference was made to the decorations in stores.

The report of the division on Lighting of Large Buildings consisted chiefly of handbook material and covers sales methods and data for better lighting.

The report of the division on Residence Lighting is of interest to the layman as well as the technical man. The separate rooms in a residence are covered and many suggestions are given which will show the possibilities of home lighting.

The report of the division on Industrial Lighting took the form of a demonstration to show some of the elements which should be understood by a lighting man before he could apply them to his work. Plant owners had evidenced a greater appreciation of the advantages of good lighting in industrial establishments.

Incandescent Lamps

A summary of the work of the Electrical Sub-committee on Incandescent Lamps, of the Canadian Engineering Standards Association, was briefly reported by Mr. George K. McDougall. This sub-committee is composed of representatives of manufacturers, public utilities, Department of Trade and Commerce, and the Canadian Electrical Association. Most of the discussion was centered around the question of the life and allowable percentage candle power reduction or smashing point; the basis of comparisons of lamps, whether it should be mean horizontal candle power or lumens output; the selection and percentage number of lamps which should be tested out of each lot, and whether the rating of series lamps should be in candle power or in watts.

Transformers

As representative of the Transformer Committee of the Canadian Electrical Standards Association, Mr. Neild reported that executive sessions had been held, including operators and manufacturers and a report adopted dealing with the standards of design of distribution transformers. This report had been forwarded to the central committee for ratification and will be published in due course. Mr. Neild suggested that the members should give more thought to the standardization of station transformers as the question may possibly come up in future.

Martin J. Insull Addressed Thursday Meeting

Mr. Martin J. Insull, President of the National Electric Light Association, was present during the afternoon session of Thursday, and addressed the members. Mr. Insull made the trip to Montreal because Mr. M. H. Aylesworth, executive manager of the N.E.L.A., who was on the programme, had found it impossible to be present.

Mr. Insull deplored the fact that the investing public seemed to be losing faith in the value of public utilities. Public utilities were essential industries and, as such, should be making sufficient profit to attract the conservative investor. He felt that it must become the business of the utilities themselves to educate and interest the general public so that they will place a correct value on the place such utilities rightly hold in the industrial development of any country. One of the methods suggested was to send interesting news items to the daily press. No business lends itself more readily to the distribution of interesting information—real news—and the average paper is quite willing to print such material if it is supplied in proper shape.

The National Electric Light Association had made plans for increasing their usefulness to the member companies, and had appointed Mr. M. H. Aylesworth as their executive manager. Mr. Aylesworth will give his whole time to the Association, the usefulness of which would doubtless be thereby greatly increased. We must endeavor to create a closer spirit of co-operation between the public, the regulating bodies, and the industry in general Speaking for the United States, he was glad to say that, wherever the public had been properly advised of the facts, they had given the public utilities, generally speaking, fair treatment. He urged that utilities should make greater effort to take the public into their confidence. The public is fair when it understands.

Mr. D. H. McDougall moved a vote of thanks to Mr. Insull for his kindness in being present and for the very eloquent and inspiring address. He bore testimony to the value of a closer association with the N. E. L. A. as he had learned by his experience as an officer in various capacities and, for a time, as one of the vice-presidents. Mr. A. A. Dion seconded the vote of thanks.

The president, Mr. A. Monro Grier, added a few words of appreciation, expressing the regret that, as far as the province of Ontario was concerned, he did not feel that he was in a position to say, with Mr. Insull, that the public, in the main, had been fair.

New Viewpoint on Modern Lighting

The general programme was brought to a close Thursday afternoon by an address by Mr. J. R. Colville, of the National Lamp Works of the General Electric Co., Cleveland, who spoke on the "New Viewpoint on Modern Lighting." Mr. Colville emphasized the great possibilities, in industrial establishments, of increasing both the quality and the quantity of the output by a properly designed illuminating system. He stated that in cases where remodelled lighting systems had increased the cost of the pay roll from 1 to 5 per cent., the actual output had been increased from 8 to 35 per cent.

And after the installation has been installed it is equally important that it should be properly maintained. Mr. Colville cited cases where the intensity of illumination had been increased from 3 ft. candles to 7 ft. candles, and from 1 ft. candle to 4 ft. candles, by cleaning the reflectors, installing new lamps (of the same size whitening walls, etc..

With reference to accidents, also, Mr. Colville had something to say. A large percentage of accidents are due to improper lighting, which cause delay in output as well as increased cost. Anything that helps to decrease the turnover of labor is worth considering, and proper illumination has a very important bearing on labor turnover and efficiency.

Mr. Geo. K. McDougall discussed Mr. Colville's address briefly, commending many points in it. Mr. McDougall expressed the opinion that it was scarcely possible to have too intense an illumination. In the olden days we got wrong impressions because when we thought we were getting illumination we were actually getting glare. Daylight represents in the neighborhood of, probably, a thousand foot candles, but glare is practically absent. Why should 10, 15, or 20 ft. candles of artificial illumination, then, be too intense? Mr. McDougall also expressed his general disapproval of localized lighting.

Mr. Colville showed a number of illustrations of highly illuminated interiors, contrasting them with installations that had been replaced. He stated that factory managers were gradually coming to realize that the advantages of correct illumination far outweigh the extra cost of installation and maintenance.

Golden Glow Engineering Report

Engineering Report No. 303, dealing with "Golden Glow" and glass reflectors generally in their relation to the locomotive headlight question, has just been issued by the Electric Service Supplies Co., Philadelphia. For convenience it has been divided into individually numbered paragraphs, and the whole prefaced by a complete index for easy and quick reference to any of the various matters covered. The report shows essentially the inherent differences between glass and metal reflectors, as well as between optically correct and incorrect (ground and unground) glass reflectors it treats of the marked superiority of glass over metal reflectors and how through their use the cost of headlight maintenance may be reduced to very low figures; it discusses the costs of glass reflectors, candle power and cost of candle power obtainable from same, as well as the limitations imposed on their production both from the standpoint of actual manufacture and cost to customer. Headlight cases are discussed along broad, fundamental lines and those facts of design and manufacture resulting in low case maintenance are prominently given.

Under the charter of the Compagnie du Reservoir Kenogami, power is given to store the waters of Lake Kenogami, P.Q., and to build reservoirs, dams, etc. The capital is $18,000.

The St. Maurice Light and Power Co., distributors of Shawinigan power in Shawinigan Falls and district, will in future be known as the Electric Service Corporation, with Mr. John Bourgeois, Jr., manager, and Mr. R. J. Everest, superintendent of operation.

Power Prices Past and Present

By R. J. Beaumont

In a few words I will endeavor to compare briefly the conditions forming the basis of power prices a few years ago with the conditions found at the present day.

Popular opinion and also the opinion of the average electrical man is to the effect that the cost of generating power in existing plants has been little effected by the increased cost of materials and labor, though in the case of absolutely new power plants and lines it has been conceded that they cost more than heretofore: but generally speaking the relation of the new cost to the power price has had but little thought.

The main items of cost which go to make up the total cost of any undertaking may be stated as being in the main three items, the cost of financing, the cost of materials and the cost of labor.

Financing

Let us first consider the cost of financing to-day as compared with a few years ago. It will be found that five or six years ago money could be obtained at an outside cost of 6 per cent. per annum. By outside cost it is meant the actual percentage to be paid in negotiation. To-day this cost will be found to be practically 9 per cent. per annum. This figure may, on first consideration, seem high, but as it includes all costs, the items of which have all considerably advanced, it is to-day a moderate figure.

Let us now consider this figure in conjunction with the increased cost of a complete new plant and we will arrive at the following conditions. We first, however, will have to make an assumption on the increased cost of the plant and equipment as compared with a few years ago, and for the minute we will take this value as having increased three times. This actual increase I will deal with in more detail a little further on, but using this figure of three times it will be seen that the same unit of value as compared with five or six years ago will to-day mean a yearly burden of 27 per cent. per annum as compared with 6 per cent., or expressed arithmetically the interest has increased one and a half times and the cost three times, or the total overhead burden four and a half times which gives us the figure of 27 per cent.

Materials

Studying the increase in the cost of materials used in power stations, transmission lines, etc., it will be found that a great increase has occurred, and below is given some of the more common materials.

	1914	1920	Increase Percentage
Copper wire	.15 per lb.	.28 per lb.	87
Weatherproof wire	.16 per lb.	.33	106
50000 v. insulators	1.50	6.50	335
25000 v. insulators	.50	1.75	250
2200 v. glass insulators..	35.00 per M	91.00 per M	160
Poles, 30 ft. cedar	1.75	7.00	300
Poles, 35 ft. cedar	2.00	8.00	300
50000 v. cross arms	.50	1.40	180
2200 v. cross arms	.42	1.20	185
Cement	[illegible]	[illegible]	
Struc. steel not erected..	.04	.08 per lb.	100

Labor

The question of the increase in the cost of labor does not need much explanation, and for the purposes of the moment we will take it as having increased 100 per cent. This figure, I think, will be accepted as being approximately right though perhaps it might be a little low when considering the fact that we are considering the entire range of labor. By that I mean the wages of the moulders engaged in the making of the generator castings down to the laborer digging the power house foundation.

Fortunately, for the electrical industry, the great increases that we have just calculated have not actually been attained and the situation has been modified by such factors as the use of much larger generator and transformer units, and also by the increased mechanical efficiency obtained in the more modern equipment; but in spite of these factors the total cost of electrical undertakings has advanced as compared with previous years to not far short of three times what it was five or six years ago. This does not mean, however, that the prices of power should be increased by three times, but as the largest charges in hydro-electric undertakings are capital charges the power prices will certainly have to be increased at least 100 per cent.

Quite a number of engineers and many purchasers of power will state the price of power in the case of water power as having a normal price of say $15.00 per h.p. per annum, or perhaps $20.00 per h.p. per annum. As a matter of fact there is no such thing as a normal price for power. The cost of hydro-electric power for the past twenty years has practically, or since the commencement of the industry, steadily increased, and while one can theorize on what might be the normal price of power based on a rate of increase obtained from results of past years, there finally is only one price that can be considered after all, and it is the price based on to-day's actual cost.

I have dealt briefly with how the present day cost of financing, materials and labor affect the cost of power from a new plant and it will perhaps be accepted by engineers on consideration that the newer prices of power at the power house are likely to be at the lowest not less than $20.00 per h.p. per annum in the most favorable conditions of large capacity and cheap development.

I will now deal for the moment with the effect of newer prices of labor and materials on the cost of plants already in existence that were constructed before the war.

Old and New Customers

There are two main considerations in the sale of power from such plants. One, the effect of the newer costs as regards old customers, and the other the same as regards new customers.

In the case of the existing consumer of power we have a state of affairs where, in the most favorable conditions, the cost of power is affected mainly by the higher wages paid for the operators, patrolmen and maintenance men. These costs are in the neighborhood of about twice what they were five years ago, while in the case of materials depending upon voltage of supply the costs are to the extent of two to four times, as can be seen roughly in the table I have just given.

In the case of new customers the question of financing extension also becomes an important factor in the power charges and the same is true to a lesser extent where older customers' loads grow rapidly, as is often the case.

I leave for the moment the question of the effect on the newer costs entering into construction and operation of power plants, and will consider such costs in connection with the relations between the power producer and the consumer.

Generally speaking, in past years the sale of power has been on the assumption that the cost of producing same was stationary, and contracts for power were often made with municipality or power users for a long term of years,

---

[illegible] ntion, Montreal.

and it can easily be understood that this condition has, in view of the higher costs, resulted in the producer having a number of very unremunerative contracts in force. This matter of increasing costs of materials in the case of steam plants, of course, has had to have attention, with the result that among the steam power producers in the United States a large number of contracts with consumers, and also the prices authorized by the various State Utility Commissions, have made use of what is known as "Coal Clause," which allows the price of power to be varied with the cost of coal.

One effect of this rising cost of power will, I believe, result in the more careful and closer measurement of the maximum demand, and also particularly the unit consumption, and thus what is known as the "combined rate" will become the common method of measuring power. In other words, the hydro-electric kilowatt will, in future, be sold as a unit with a price, and a straight demand charge of so many horse power or kilowatts per month or per year, as the case may be, will disappear.

Curiously enough, the average power purchaser thinks that the price of power is a thing that should not raise, and that there is no reason for it to do so, though he realizes the fact that during the last five years the purchasing power of the dollar has declined 50 per cent. of its former power. That alone almost justifies doubling the power price.

In conclusion, it will be seen that these notes have not dealt with the subject in detail, which owing to the enormous range of conditions that obtain could hardly be presented at the meeting of this association, but it will, I hope, serve the purpose of drawing attention of the engineers to some of the features involved in the sale of power, and perhaps cause further discussion on the subject.

New Method of Demonstration Draws the Crowd

So important is the window demonstration method of advertising that it has been adopted by some men as a profession. Such a demonstrator goes from store to store for periods of a week or more and demonstrates any article desired by the dealer employing him. For the most part these men use the silent method, having as their equipment a set of cards bearing short pointed explanations of the article for which the special advertising has been arranged. They point to the cards and then to the particular part of the article in question, and as far as is possible by dumb show, display its good points.

One of these demonstrators uses, in addition to the method just described, what he calls an electric enunciator. This apparatus consists of a telephone transmitter of the type used on switchboards, and a receiver fitted up inside a megaphone and attached to the outside framework of the window. A small hole bored through the frame allows a passage for the wire, while the power for the apparatus is obtained from the store lighting system. The megaphone acts as an amplifier, magnifying the voice so that the crowd can hear all that the demonstrator says. He never fails to draw a crowd.

Catalogue of Insulating Materials and Supplies

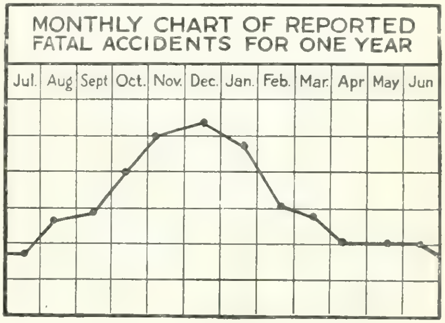
Miniature Catalogue No. 5-A-1, giving a complete list of all insulating materials and supplies, has just been issued by the Westinghouse Electric and Manufacturing Company East Pittsburgh, Pa. Included in the list of products described are: mica, micarti and Bakelite micarta plates and tubing, treated and untreated cloths and papers, insulating and soldering compounds, insulating oils and tapes.

Profits From Good Lighting

Good lighting has been accepted by industry. It has won approval because it is profitable. Good lighting produces its beneficient results primarily through its effect on working conditions. Every worker does as much with his eyes as with his hands. Physically, good light protects his eyes and guides his hands, preserves his vision and improves his skill. Mentally, good lighting increases his confidence and makes for happiness at work and at home. This is actual conservation of human material, which really constitutes the wealth of the nation.

Through physical and mental improvement, men are able to work cheerfully, more accurately and more speedily. The heavy loss from spoilage is lightened. Betterment of light removes one of the most prolific causes of damaged goods.

That poor lighting is a cause of accidents is proved by careful records made some years ago of the number of accidents throughout the year in a large number of factories. The chart on this page is a graphic reproduction of this record during one year. The peak of this curve is from September to past the middle of March, when it starts down again. The months of long nights and poorest natural light are shown to include the great proportion of fatal industrial accidents. The reduction of this peak, the lessening of the heavy toll taken by industrial accidents, lies largely within the scope of correct artificial lighting.



By preventing accidents, good lighting increases the confidence and skill of the workmen. It lifts from the employer the burden of financial loss in wages, in time, and in lowered morale.

Therefore, as experience has taught that great benefits flow from the correct use of light, it is only proper that the requirements of correct lighting, the conditions under which correct illumination is approximated, be laid down that the industrial executive may read. Quality in illumination occupies a most important place on the list of first aids to good factory management. Correct lighting is an item of such striking consequence that Professor Clewell, of the University of Pennsylvania, an authority on industrial lighting, has given an average of results he observed as approximately 12 per cent. increase in production, 25 per cent. decrease in spoilage, 25 per cent. reduction in preventable accidents.

Hundreds of installations have been made in Canadian factories, which fall within the category of correct lighting. There are thousands of industrial plants where the lighting arrangements should be thoroughly overhauled and appliances installed which will bring the efficiency of each one of them up to the standard indicated by the above figures.

Merchandise Accounting for Ontario Hydro-Electric Municipalities

By Mr. G. J. Mickler*

Perhaps no department within the control of municipal hydro utilities is so poorly administered and so inadequately furnished with the machinery necessary for its proper handling as is the "Merchandise and Jobbing" department.

While the prime purpose of all municipal electric utilities is only that of distributing electrical energy, nevertheless the growing popularity of that element of usefulness with the corresponding demand for appliances and devices for its utilization, often makes it imperative that central distributing stations engage in the business of merchandising electrical appliances and very often of taking up wiring of consumers premises as well. This practice is found necessary to insure the proper installation of equipment most suited to the brand of energy being distributed, also to afford a measure of protection to the consumer who is so often swindled into purchasing and installing appliances not at all suited to his needs, and inefficient as well.

The purpose of this paper is to outline a system of stock records, billing and office records to safeguard the purchases that are made by Hydro municipalities of merchandise for sale, and to ensure the ultimate collection from customers of the amount of their purchases.

Fundamental Principles

The fundamental principles governing the establishment of a suitable accounting system may be summed up in the following way:

(1) The system should be simple.

(2) All forms should be standard and their number kept to a minimum.

(3) All sales, whether contract, instalment, credit or cash, should be posted and a complete, detailed record kept of them.

(4) A merchandise account should be created showing debits for purchases and credits for material sold or disposed of in any way.

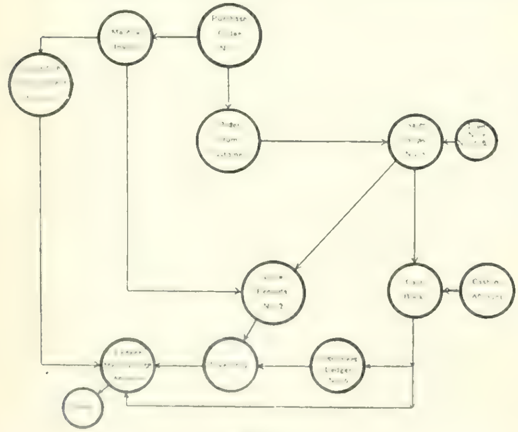


Chart I

(5) A stores record of material purchased and stocked, should be kept, where possible, to keep accurate accounts of all material and to facilitate the checking of periodical inventory.

(6) A general ledger containing all accounts should be made part of the system.

Classification

Hydro municipalities may, for the purpose of merchandise records, be divided into two general classes.

(1) Those under which the cash record, in-bound, outbound, forms the basis of all original entries and no control accounts are possible.

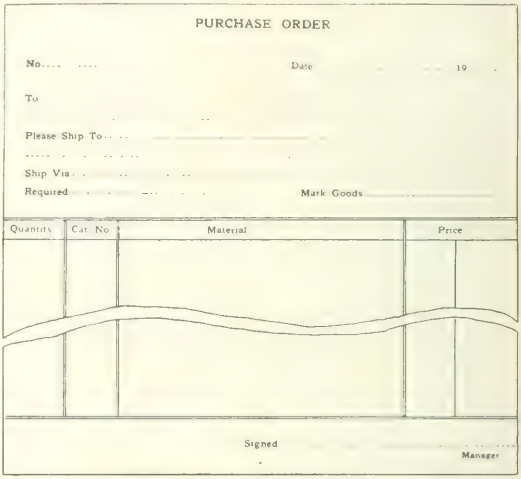
Business in these places is usually carried on in a small way, so the complexity of control accounts may be avoided.

(2) Those in which expert accountants are employed and where all the requirements of good accounting can be put into practice.

No. 1 may be further sub-divided into two classes:

(a) Municipalities engaging in merchandising business only.

(b) Municipalities engaging in the wiring and jobbing as well as the merchandising business.



PURCHASE ORDER

No.......

Date .... 19....

To

Please Ship To........

Ship Via..........

Required..........

Mark Goods..........

Quantity	Cat. No.	Material	Price

Signed ....
Manager

Fig. 1

Class 1 (a)

Under this class it is assumed that no wiring business is transacted and that appliances and small supplies are handled. The records obtained are on a cash basis and the keeping of control accounts is not feasible.

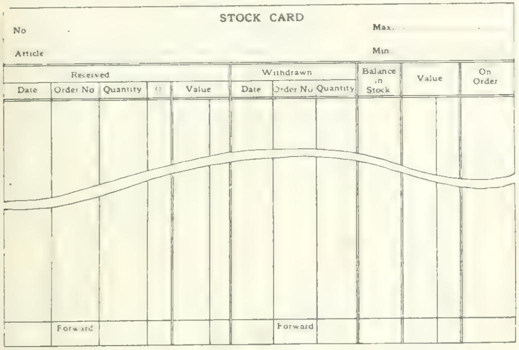
On the accompanying Chart No. 1 are graphically illustrated the various steps to be taken from the time the material is ordered until the profit and loss account is reached. The forms recommended for use are referred to by numbers in the different circles, and the lines connecting the circles indicate the sequence of the accounting operations, or the way in which the business flows through the accounts in the system.

---

*Assistant Auditor of Municipal Accounts, Hydro-Electric Power Commission of Ontario, before Niagara Falls Convention.

Purchase Requisition

The first step for this class of business is to put in a stock of material to do business with, and each purchase of material is to be covered by a requisition or purchasing order. In the ordinary municipality a purchase requisition of very simple form only is required and that illustrated as Fig. 1 is designed for this purpose. The form is so simple as to require no explanation, except that it is to be made in duplicate, one copy for the manufacturer and one for office use.



STOCK CARD

No Max.

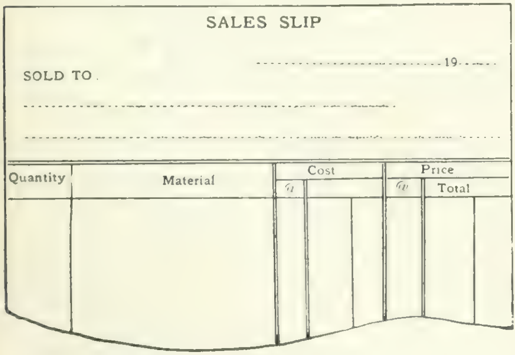
Article Min

Received					Withdrawn			Balance in Stock	Value	On Order
Date	Order No	Quantity	@	Value	Date	Order No	Quantity			
	Forward					Forward				

Fig 2

Incoming Invoices

The invoice from the manufacturer occupies the second place in the system. On the receipt of this invoice, it is to be checked against the purchase order and verified, after which the material received should be examined and checked as to quantity, size and so on, to correspond to the invoice. Shortages, breakages or articles requiring refund or credit from the manufacturer, should be dealt with immediately information regarding them is available, and on the receipt of a credit note, such is to be attached to the original invoice and both passed on for payment.



SALES SLIP

SOLD TO .... 19....

Quantity	Material	Cost		Price	
		@		@	Total

Fig. 3

Card Record of Stores

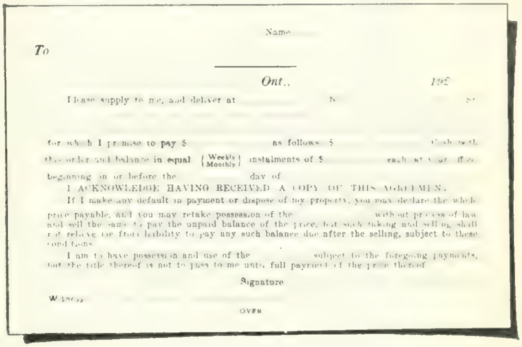
When the material is taken into stock, it is to be kept in a safe place, preferably under lock and key, and no one but the person in charge of the material should have access thereto. It is also necessary to keep account of all material in-bound and out-bound, and for this purpose the card records of stores are introduced.

A card is to be made for each item of material purchased, and the entries are made on the receiving side immediately the goods are received and the invoice checked. The invoice is to be marked to signify that the stock record has been properly entered therefrom. A rubber stamp with this and other necessary particulars on it, with blanks to fill in for various operations, is recommended for this purpose.

Fig. 2 illustrates a form of stock card of special value for the purpose which it is supposed to accomplish. Space is provided for all incoming items with their cost and total value, also for withdrawal items as well as for the balance of material on hand, with the total value of this balance. This last feature enables one to determine at once the average value per unit of the material recorded, also to check up with the inventory as to quantities, and to price the quantities on hand in the inventory.

Collection of Charges to Merchandise Account

When the invoices have been checked and approved for payment they are vouchered and paid in the ordinary way, and as the disbursement journal is provided with a special column to take care of merchandise charges, this supplies a medium for collecting all the charges to the Merchandise Account, and the total thereof is posted periodically in the general ledger.



Name

To

Ont., *192*

Please supply to me, and deliver at N St

for which I promise to pay $ as follows $ Cash with this order and balance in equal {Weekly / Monthly} instalments of $ each at your office beginning on or before the day of

I ACKNOWLEDGE HAVING RECEIVED A COPY OF THIS AGREEMENT.

If I make any default in payment or dispose of my property, you may declare the whole price payable, and you may retake possession of the without process of law and sell the same to pay the unpaid balance of the price, but such taking and selling shall not relieve me from liability to pay any such balance due after the selling, subject to these conditions.

I am to have possession and use of the subject to the foregoing payments, but the title thereof is not to pass to me until full payment of the price thereof

Signature

Witness

OVER

Fig. 4

Expenses Other Than for Materials

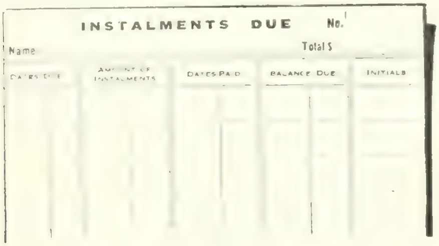
Into this column are carried also all charges incidental to the carrying on of the merchandise business, such as freight and express, rent, office expenses and salaries, advertising and other miscellaneous expenses; and the total debits in the merchandise account represent all the costs of the Merchandise department.

Sales Slips

Now that material is in stock and paid for, business with the public can be carried on and sales affected. Material may be sold and disposed of in a number of ways—by cash sales, credit sales, on the instalment plan or on approval, and the Counter Sales Slip, as illustrated by Fig. 3, is provided to take care of all of these classes of sales. The slips are bound in triplicate, one copy to be given to the customer at the time of sale, the duplicate to be retained for cash book or customers' ledger records, and the triplicate to remain in the binder to form a complete record of all sales, also to provide a check in case of error, and for stock record entries. All copies of these slips are to be numbered consecutively, the purpose of which is obvious. In order to keep proper account of all sales, an unbroken record of them must be available and the consecutive numbers, if printed on the forms by the manufacturer, provide such a record. Every slip, both duplicate and triplicate, must be on file and available for check by the auditors or others whose business it may be to check them.

Credit Sales

When a customer makes a purchase, the clerk makes out a Sales Slip showing the quantity, description and price of the articles purchased, and the total amount shown represents the amount of the sale. Should the customer desire to take advantage of the credit terms allowed on some purchases, the terms of the sale are to be indicated on the slips, with the amount of deposit, if any, also shown; and, if the purchase is made on the instalment plan, full particulars as to price and amounts of the instalments as well as the original payment are to be shown. The original slip is then given the customer and the copies retained as indicated above.



INSTALMENTS DUE No.

Name Total $

Dates Due	Amount of Instalments	Dates Paid	Balance Due	Initials

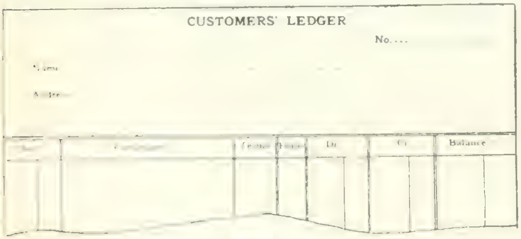
Fig. 5

Lien Notes

With credit and instalment sales of any magnitude, preferably for amounts above a certain fixed minimum, it is recommended that the customer sign a Lien Note to guarantee the ultimate payment of the amount due or the return of the goods to the store. This practice is followed by all large credit merchandise houses with good results.

Fig. 4 illustrates a form of lien note that covers almost every case of credit sale to be met with in the appliance business, and is very satisfactory because of its condensed form. The forms are to be made out in duplicate, one for office use and one for the customer, and they are to be numbered with the number of the sales slip covering the sale.

Lien notes are ordinary promisory notes with a clause added which prevents the ownership of the articles sold from passing to the purchaser until the notes have been paid in full.



CUSTOMERS' LEDGER

No. . . .

Name

Address

	Particulars	Terms	Folio	Dr	Cr	Balance

Fig. 6

Law re Lien Notes

In Ontario the Lien Law provides that for these condition sales to be binding against subsequent purchasers or mortgagees without notice in good faith for value consideration:—

(1) The agreement must be in writing and signed by the "Bailee" or his agent.

(2) A copy of the agreement shall be left with the "Vendee" at the time of the sale or within 20 days after the execution of the agreement.

(3) A copy of the agreement shall be filed within 10 days of its execution, in the office of the County or District Court, in all cases except the following:

(a) A contract respecting manufactured goods, including pianos, organs and other musical instruments, which at the time possession is delivered have the name and address of the seller painted, printed, stamped or engraved thereon, need not be filed.

(b) A contract respecting household furniture other than pianos, organs or other musical instruments, need not be filed.

Articles thus sold and the note not being paid on maturity, the seller may retake at once, or he may sue on the note, and if he fails to recover he may retake the article.

Record of Instalments

Fig. 5 shows the reverse side of this Lien Note form, which provides for the recording of different due dates and amounts of all instalments, also the dates and amounts paid and the balance still due.

At the end of each day if the volume of business warrants it, or at the end of some other definite period, the Sales Slips are to be compared with the Stores' Cards, and the withdrawals written up showing all the necessary particulars. It is to be noted on the Sales Slips that these records have been properly written up.

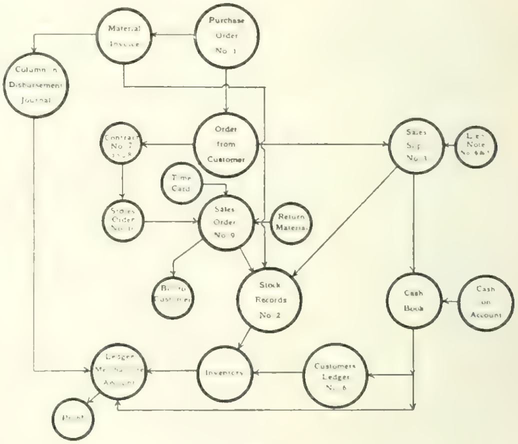


Chart II.

Entering in Cash Book

The duplicate of the Sales Slip, which is to be used as a record of cash received, is filed with the other cash collection stubs for light and power accounts, and the amounts entered up in the cash book in the regular way. In the case of customers paying cash, the numbers of the individual slips are to be shown in consecutive order and the amount carried to the merchandise column provided for the purpose. The slips containing payments on account of credit sales or instalments are to be entered to show the name of the customer as well as the number of the slip.

Recording Payments on Account

For the recording of subsequent payments on account of credit sales or instalments, a Sales Slip is to be made out in the regular way, omitting of course any materials, simply showing the customer's name and address, and stating that the amount shown is a payment on account of instalment account number ———

Posting Cash to Merchandise Account

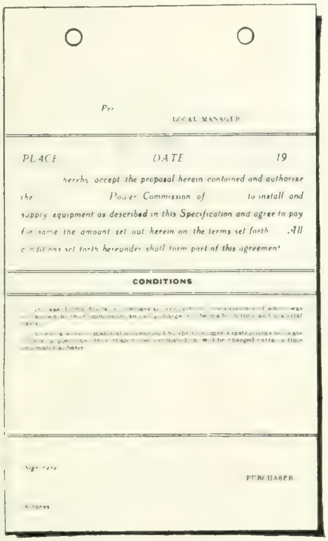
The total of the receipts at the end of every month, or posting period, is carried to the credit of the general ledger account "Merchandise."

Customers' Ledger

The Sales Slips representing credit sales are taken and used to open up a customers' merchandise ledger to keep track of all unpaid merchandise accounts.

Opening of Customer's Ledger

Fig. 6 illustrates the style of Card Ledger used for this class of account. One of these cards is to be written up for each account to be carried and all particulars as to date of purchase and amounts charged to be shown in their proper spaces, as well as terms of sale and amounts of instalment agreed upon at the time of sale.


Per

LOCAL MANAGER

PLACE DATE 19

hereby accept the proposal herein contained and authorise the Power Commission of to install and supply equipment as described in this Specification and agree to pay for same the amount set out herein on the terms set forth. All conditions set forth hereunder shall form part of this agreement.

CONDITIONS

Sign here PURCHASER

Address

Fig 7

Indexing of Customer's Ledger

These cards are to be arranged and indexed in the order of the lighting and power account cards of the Utility. This arrangement will prove valuable when it is found necessary to place on the customers' monthly bills the amount due on account of merchandise purchased, or on the instalments due, and affords also an easy way to locate the accounts.

Posting Customers' Ledger

When payments are made on account of any open accounts in this ledger, the posting is to be done from the cash book direct and the cash book entry should show the folio or signal to signify that the posting has been done. In like manner, the card should show the cash book page from which the amount was posted.

Filing Closed Accounts

Ledger cards for paid accounts, or accounts which have been balanced, are to be filed in a duplicate index and are to be returned to the original index when more credit is extended.

Balancing Ledger and Inventory Into Merchandise Account

At the end of a business period a balance of customers' accounts, unpaid, is to be drawn off, an inventory taken and costed, and the total of these two items carried to the credit side of the merchandise account in the general ledger. In this account all invoices for material taken into stock and not yet paid for, are to be added to the debit side, and the difference between the two, debits and credits, represents the amount of profit or loss resulting from operations during the period.

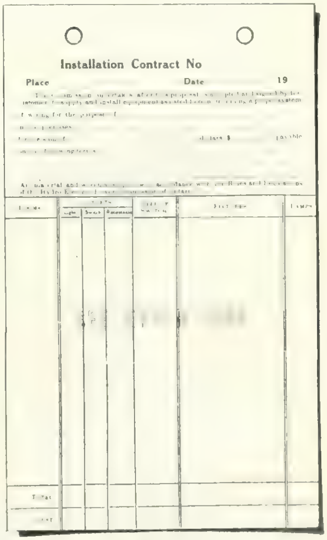
These methods, with the forms outlined above, cover the simplest form in which merchandise records can be properly taken care of, and presupposes the handling of appliances and small supplies only.

Class 1—(b):

From the accompanying Chart No. 2 it will be seen that for the Utilities engaging in the wiring business as well as that of merchandising there are further records to keep. A customer desiring some work done, say a wiring installation, has to sign a contract after the estimate of the cost of the job has been completed and the price named.

Contracts

A form of specification and contract is illustrated in Fig. 7 and 8, which answers the purpose very well; one side showing the installation particulars gives the customer an idea of what he is getting for his money, also an opportunity to check the actual installation against the specifications. The reverse side shows the contract itself with its reservations. Contracts should be numbered to agree with the number of the sales orders next referred to.


Installation Contract No

Place Date 19

Fig 8

Sales Orders and Stores Requisitions

The contract signed, a Sales Order, such as Fig. 9 is made out, and at the same time a Stores Requisition, such as Fig. 10, on which is listed the material required for the job, is to be filled in. These Stores Requisitions are to be made in duplicate, one for the work foreman and one for use of entering the particulars on the sales order and on the stock cards.

Filling in Sales Orders

The Sales Order, it will be noted, provides for the taking out of 4 lots of the same item of material, i.e., if a number of items have been listed, and more than any one of them is required for the job, a second entry to the left of the first is made for the second quantity taken, and so on, thus avoiding changing the original amounts set down and allowing a check to be made with the stores requisitions.

The Sales Order also provides space for the time of workmen employed on the job and the entries for the time are to be made from the time cards, one of which it is supposed every utility employing men requires to be made out daily. Space is also provided for sundry expenses incurred.

Completing Sales Orders

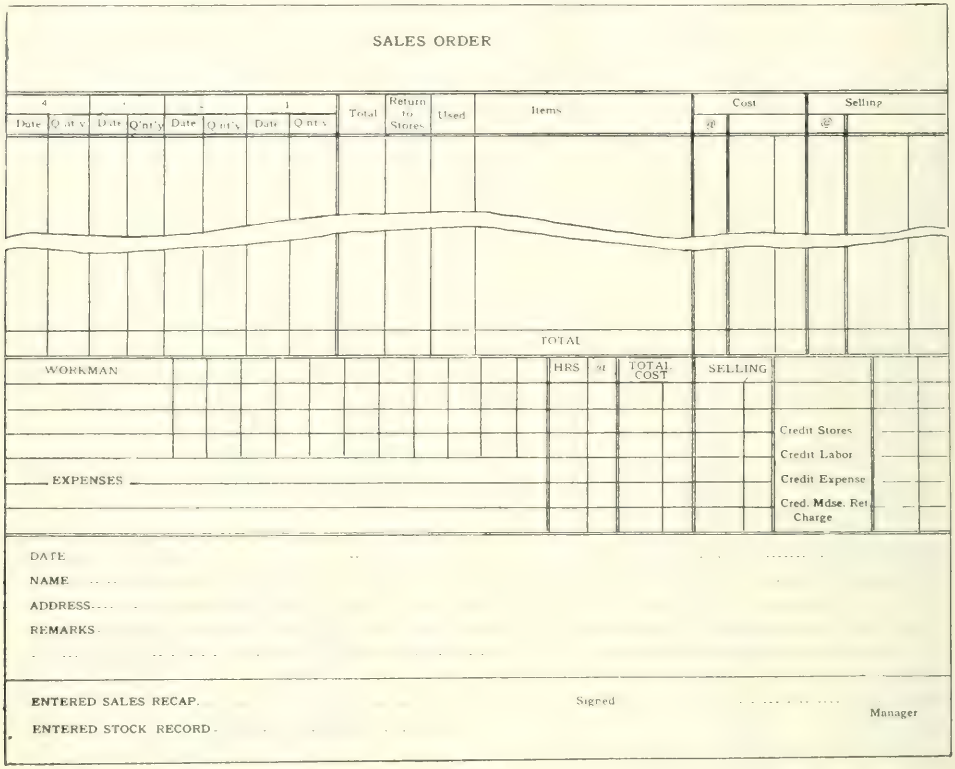
When the job is completed, the net amount of material used is figured out. The cost per unit is taken from the stock cards, and the total cost of the material thus used determined. The selling price is also extended on the form for each item for record purposes, unless the customer be billed on a time and material basis, in which case the selling prices will be used as the basis of billing. The labor cost and sundry expense items are to be figured out and extended, as well as the selling prices of these items, and the form is then complete as called for, and ready to have the customer's bill made out.

These Sales Orders are to be numbered consecutively when issued and filed in their proper order in a Shannon file and preserved for use when making future estimates; also to provide a means of checking by auditors against the record of customers' accounts rendered.

Writing Up Stock Cards

The entries on the Stock Cards for material used are to be made from the Material Requisitions when issued, and returns to the stores of materials unused are to be recorded on a Material Requisition also, and the fact that the material has been returned from a particular job indicated, after which the quantities are to be entered on the Stock Cards as material received.

The method of handling purchases, invoices and incoming material records for this combination of merchandising and jobbing, is just the same as that outlined in Class 1 a.,



SALES ORDER

4		3		2		1		Total	Return to Stores	Used	Items	Cost		Selling	
Date	Q'nt'y	Date	Q'nt'y	Date	Q'nt'y	Date	Q'nt'y					@		@	
											TOTAL				

WORKMAN	HRS	@	TOTAL COST	SELLING		
					Credit Stores	
					Credit Labor	
EXPENSES					Credit Expense	
					Cred. Mdse. Ret Charge	

DATE

NAME

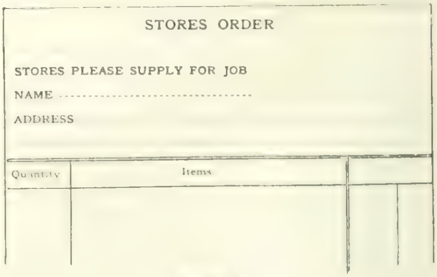
ADDRESS

REMARKS

ENTERED SALES RECAP. Signed Manager

ENTERED STOCK RECORD

Fig 9



STORES ORDER

STORES PLEASE SUPPLY FOR JOB

NAME

ADDRESS

Quantity	Items	

Fig 10

as is also the procedure referring to cash and other classes of sales, right through to the Profit and Loss account, the only difference between the two classes is that the wiring and jobbing business has been fused into the records of Class 1 a, so the operations of that class need not be gone over again.

Class 2

Chart No. 3 is somewhat differently arranged from Nos. 1 and 2, although in the main the procedure to be followed in all three is the same.

For purchase made outside, there will be required one business in connection with that of wiring and jobbing, forms must be provided for the carrying of all the records to the control accounts that it is necessary to keep, to complete the accounting system. Otherwise the routine, as outlined under Class 1 a and 1 b will be followed.

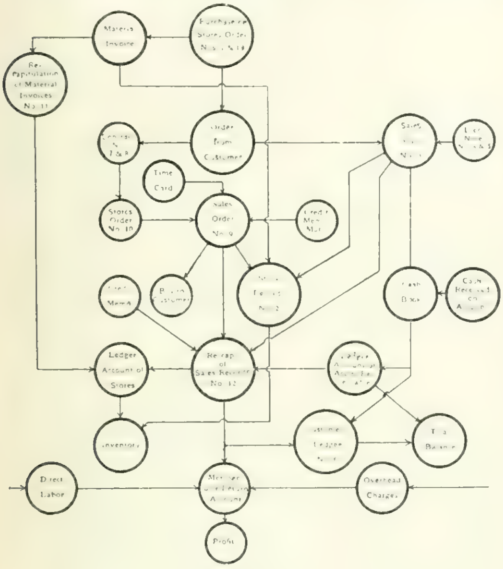


Chart III.

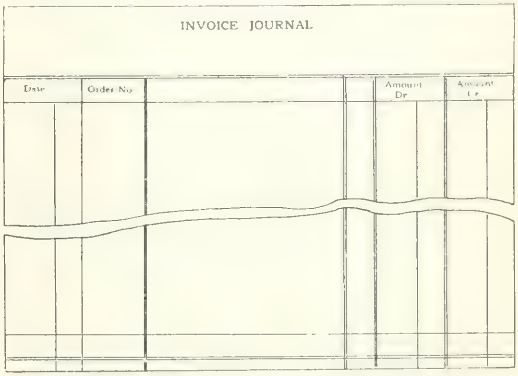
It is assumed that the Merchandise Department of these utilities purchases material from the manufacturer, or is able to procure some materials from a General Utilities Stores Department.

Extra Requisitions for Purchases or Stores Transfers

The Purchase Requisition described as Fig. 1 will be supplemented by extra copies as per Fig. 13, enough copies of which are to be made to suit the needs of a particular utility.

For purchases made outside, there will be required one copy for the manufacturer, one for the use of the Accounting Dept. and one for the Merchandise Dept., and all copies will be similar to Fig. 1. In case material is procured from the General Stores, 4 copies will be needed, 3 copies as per Fig. 13 will be sent to the Stores Dept. and 1 as per Fig. 1 retained on file in the Merchandise Dept.

Of the first three, two are to be returned to the Merchandise Dept. with the shipment or transfer of material. The quantities and prices at which Stores hold the material for transfer are to be noted on these two copies, when they will form inter-department invoices in duplicate. When these have been checked and verified, one will pass on to the Accounting Dept. for further recording, and one retained by the Merchandise Dept. The third copy will be retained by the Stores Dept. for its files.



INVOICE JOURNAL

Date	Order No			Amount Dr	Amount Cr

Fig. 11

Listing Incoming Invoices

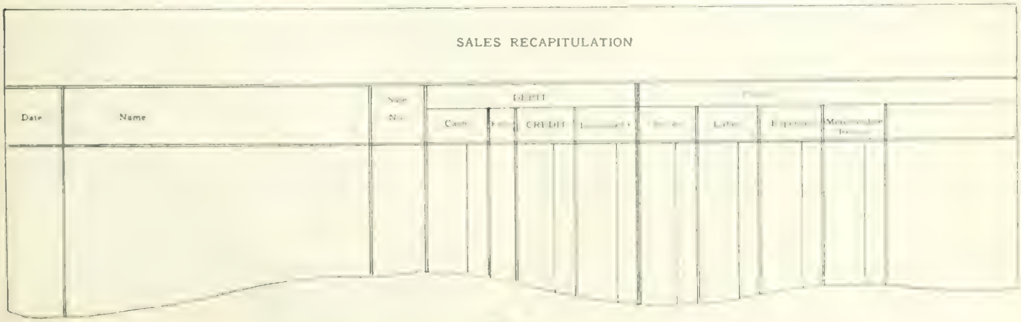
Invoices for material, whether from stores or from outside firms are to be listed as received according to date, after they have been properly checked. The listing can be done in an ordinary journal, illustrated as Fig. 11 and the total of these purchases journalized therefrom to the General Ledger Account of "Merchandise Stores."

Costing Sales

The cost of material sold by counter sale slips is to be determined from the Stock Cards and shown on the office copies of the slips which are filed in numerical order.

Listing Sales

The jobbing sales orders and counter slips are to be listed on form Fig. 12 in their respective consecutive order.



SALES RECAPITULATION

Date	Name	Sale No.	DEBIT				[illegible]				
			Cash	[illegible]	CREDIT	[illegible]	[illegible]	Labor	[illegible]	Merchandise [illegible]	

Fig. 12

It will be observed that the form calls for a distribution of selling prices into three columns, Cash Sales, Credit Sales and Instalment Sales. This is to permit carrying separate control accounts for each of these classes of accounts. The Cash Sales total must also agree with the record of total Cash Sales recorded in the Cash Book for like periods of time.

Distributing Cost and Selling Price

The cost is to be distributed into the columns entitled Materials, Labor and Expenses, and the Merchandise Return Account represents the difference between the Cost and the Selling Price. All of these items can be determined from the Sales Orders and the Cash Sales Slips, if these have been properly executed. Credit memoranda for materials returned by customers or for credits and other allowances made will be made out either as Sales Slips or Sales Orders, properly indicating that they are to be treated as credits, and numbered in the regular sequence of the other debit orders, and put through the recapitulations in red ink. The totals of the debit columns will be posted to the General Ledger "Accounts Receivable" Accounts, and the totals of the credit columns to the various accounts indicated.

Posting Sales

Posting to the customers' ledger accounts is to be done from this Sales Recapitulation, on which folios referring to ledger accounts are noted. Folios are also to be shown on customers' ledger cards to refer to the recapitulation pages, from which the posting is done.

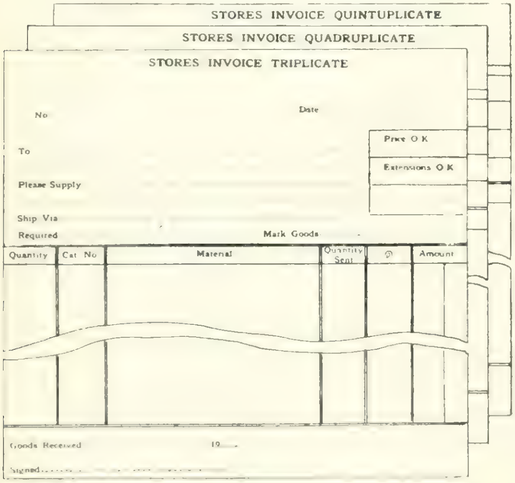


Fig. 13

Posting Cash

The cash received for Cash Sales or on account of Customers' Ledger accounts is posted to the credit of the General Ledger, "Accounts Receivable" Account direct from the cash book. At the end of a business period, say monthly, this control account balance is to be checked against the total of the balances in the Customer's Ledger, and the two balances should agree.

Making Inventory

At the end of a year or any other period, as may be desired, the inventory of material is to be checked against the quantity recorded on hand at the present price per unit of cost as shown on the stock cards, and the total value of the inventory is to be checked against the balance in the control account, "Merchandise Stores." These should agree.

Merchandise Return Account

With the inventory and the accounts outstanding verified against the two control accounts, it is next necessary to turn attention to the "Merchandise Return" account. This account, as can be seen from this chart, and as indicated on the record of Sales Recapitulation, is the gross difference between the bare cost of materials sold, and the total return for materials, labor, and all other items, as well as profit, as indicated by the Selling Price.

Overhead Charges

In order to determine the net profit for any period, items directly or indirectly affecting the cost of merchandising, must be carried to this "Merchandise Return" account. Direct labor charges as affecting the Sales Orders will be charged through the Pay-Roll Distribution monthly. Salaries and Wages of Stores' Clerks, Salesmen and others will be charged from the Pay-Roll distribution. Other items such as advertising, rent, heat, light, repairs, insurance, taxes, interest, telephone, printing, delivery, travelling and other miscellaneous expenses will be charged to this account through the medium of the record of Accounts Payable or Disbursements, if direct charges can be made, or as proportions of regular accounts of the utility, if general accounts for such items are kept, or both, as the case may be.

Profit

The net amount remaining in "Merchandise Return" Account, after all the charges as enumerated above have been made, represents a profit if it is a credit, and a loss if it is a debit balance.

The various systems outlined above, may to the layman, seem very complicated, and the accompanying charts confusing at first sight to even some with considerable accounting experience and knowledge, but close study will reveal how simple everything really is, and that nothing can be eliminated if a complete record of every transaction and a complete record of stock is to be maintained. It should be the aim of all hydro municipalities to be able to keep their records in the most up-to-date fashion, and while these systems may not meet the requirements of any and every one of them, they are sufficiently flexible to permit any municipality to adopt one or the other with but slight variations, depending on the general system of accounting in use for the utility accounts.

Let it be known also that for municipalities of Class 1 a and 1 b, arrangements are being made to have the necessary forms carried in stock by the Hydro-electric Power Commission of Ontario, thus enabling these utilities to purchase such forms at a minimum of cost and uniform as well.

Assistance will also be given to any municipality when ready to instal a system of merchandise records, to make sure that everything is properly installed.

The Thames Valley & Ingersoll Electric Railway Company has announced an advance in its rates. The return fare from Ingersoll will be 50 cents, instead of 40; to Beachville, 25 cents, instead of 20 cents, and on Dundas street, 7 cents, instead of 5 cents.

The St. John Valley Electric Light and Power Co., Ltd., with head office at Woodstock, N. B., is a new firm recently incorporated with capital stock of $300,000.

Discussion on Mr. Mickler's Paper

Mr. Hillman: (Toronto) One very important feature in connection with appliance sales is the necessity of balancing the cash sales daily with the teller's records; that is accomplished through the sales journal.

Another very important feature that Mr. Mickler points out is the necessity for keeping appliance stock under lock and key, and records should be carefully kept of appliances that are in the storeroom, or in the sales room. Unless careful record is kept of merchandise that is on the floor, too, sales may be made without being recorded or appliances may disappear.

One feature in connection with lien notes which Mr. Mickler points out is that they need not be registered if the apparatus bears the name and address of the seller. A distinction is made between the manufacturer's name and the name of the seller. If you are selling a washer, for instance, which does not have the name of the particular utility that is selling it, it is necessary that that lien note should be registered. It is also required that the appliance be identified, particularly with regard to the serial number. Cases have come up in the sale of small motors and washing machines where serial numbers were not properly reported and there was difficulty in proving the ownership of the appliances.

Another very important feature pointed out by Mr. Mickler is that sales slips should be numbered by the printer and preferably these sales slips should be recorded in the sales journal in numerical order. This method facilitates auditing. Some times it happens that appliances sold in one month are not delivered until the succeeding month. Where the Utility closes its books monthly it is desirable that the sales slips numbers which have not gone through the records should be carried forward into the Sales Journal in the succeeding month, even if there is no sale opposite it.

Another rather important feature is the question of customers returning appliances which for some reason or other they do not wish to keep. Mr. Mickler suggests using sale slips for that purpose, but in the case of large Utilities it is probably desirable that special forms of return vouchers should be used, which would record on them the original sale slips numbers and the name of the purchaser and address, and the disposition of the appliance when it comes back, whether it goes back to the stock room or on the floor of the sales room. These return vouchers should be properly authorized before the teller is advised to refund the money.

A very important class of material which should be carefully accounted for is lamps. In our office it is the practice to balance the lamp sales daily against our lamp stock. That provides for insuring carefulness on the part of the employees in regard to class of lamps sold, and it provides also a valuable source of information for the Utilities, so they may know what lamps are most in demand. In that way they are able to keep track of their stock and replenish it as time goes on.

A very effective method of collecting installment sales is to combine them with the regular lighting bills. In this way the customer understands that the installments are to be paid with the regular bills.

Mr. Blay: (London) Mr. Mickler's proposed system is hardly open to much criticism, as far as London is concerned, for the good reason that, in all essentials, it follows definitely our own system of accounting. I have followed him step by step in the light of our own accounting practice, and this chart is, to all intents and purposes a graphic illustration of our own system.

I can say little about the specimen forms submitted by Mr. Mickler. It is my opinion that forms of this nature can hardly be standardized. Local conditions and local requirements are by no means fixed quantities, and these forms must be modified and varied as conditions gradually change, to keep them practicable.

In our municipality, the system installed binds the hydro shop closely to the mother department, in the same manner as any branch office of a private firm is bound to its head office. The hydro shop also uses the mother department as its banker, that is to say, the mother department is responsible for all the indebtedness incurred by it. It has no liabilities at all, except to the main department. It carries no cash (except, of course, enough current funds to make change, etc.) and all moneys received are deposited daily with the secretary of the main department. The system we now have operating permits the collection department to take the public's money for hydro shop transactions with the same routine facility as it collects water or lighting rates: through the same wickets; through the same cashiers. This applies, of course, to wiring transactions also. To be adequate, a system has to allow such transactions as the purchase of a coffee percolator, payment on the wiring of a house, the water rate, and the monthly light bill, to be settled by one cheque if need be. In actual practice this happens scores of times daily, as our mails will testify.

A color scheme of invoices (with the usual stubs) looks after this quite readily, with a "Hydro Shop" column which runs through the accounting system of the main department, keeps the clerical work down to an absolute minimum, as it permits of totals only being posted to the head office controlling account, while the pieces, in detail, readily fall into place in the Hydro Shop's subsidiary system. This latter system, although subsidiary, is a full and complete accounting system in itself (along the lines set out by Mr. Mickler) and enables us to compete with progressive private firms without any bookkeeping handicaps. One advantage, from the viewpoint of the retailing department, in keeping their accounts separate from the wiring department, is that it enables them to keep a much closer tab on stocks than would appear to be possible with Mr. Mickler's plan. The stock of retail stores selling electrical appliances, seems to fall naturally into a classification somewhat along the following order. At least, they do in London: (1) Irons; (2) Washers, and ironers for laundries; (3) Cleaners, such as vacuum machines; (4) Fans; (5) Heaters—air; (6) Stoves and ranges, cooking contrivances; (7) Miscellaneous appliances of all sorts, such as (say) hair cutting machines, toy trains and novelties (8) Sewing machines; (9) Toasters and grills; (10) Fancy lamps and illuminating devices with fancy shades, etc.; (11) Materials for repair work of all kinds; (12) Lamps, ordinary glass bulb; (13) Motors, actually in stock; (14) Motors, on rental or on loan.

Subdividing our merchandise thus allows us to keep a close grip on the stocks carried, and this is all important these days, with prices fluctuating as they are.

Having such a subdivision of our merchandise, it follows naturally that the form we use corresponding to Mr. Mickler's Recapitulation of Sales Records (No. 12) is altogether different from the specimen shown. Our form is columnized to enable us to enter cost prices under the heading of the stock concerned, and the totals of these columns form the basis of a journal entry, at the end of the month. In actual practice, we have two of these Recapitulations of Sales records, one looking after Cash Sales and the other after the Time Sales. I note that Mr. Mickler's system keeps tab on installment sales (as apart from credit sales). This is a point worth looking into.

Mr. Mickler: I might say that it wasn't the intention when this paper was prepared to elaborate on system No. 2 or to give such detail as would allow a city like Toronto or Hamilton or other utilities of like size, to take this system and install it in their own utility as it stood. The main object of the paper was to set up a system for the smaller utilities and give them suggestions of forms and other things that we are using, and while these forms perhaps would not answer the needs of the large cities, the majority of them will be found to answer all that is required by the smaller municipalities. I simply put in chart No. 3 to sort of complete the trend of thought.

Mr. Taylor: In the case of a small municipality that combine both water and light under the one commission, would they have to keep two systems, one for the light and one for the water I notice Mr. Blay says they combine water and light together. In the case of one commission would you have two separate accounts, one for water and one for light, could they be combined?

Mr. Mickler: I might say that it is possible to incorporate the accounts of the water works and the electrical department into one and at the same time keep them entirely separate. It simply means keeping sufficient columns in your books to take care of what accounts you want to keep. Of course it has been ordered by the Hydro that all Hydro funds be kept separated from the water department's funds, and that doesn't leave very much choice in the matter. As a matter of fact you have got to keep the water accounts entirely separate from those of the electrical department. It is unfortunate that that is the case, but experience has taught us that it really paid, and while the thing can be incorporated in one system it is better to keep them separate.

Mr. Stewart: (Toronto) I think it is advisable that return vouchers should be used for goods returned; it leaves the sale slips with nothing on them but actual sales and this saves a great deal of time when it becomes necessary to find something on these sales slips.

One point that Mr. Mickler did not speak of occurred to me, and that is in connection with requiring customers purchasing on the installment plan to insure the articles until such time as they are paid for. There might be difficulty in collecting that insurance in case of a fire but the number of cases where it would be collected would warrant a utility putting it in force.

We have eliminated two spaces in the form of agreement. Where you fill in the name of the purchaser in the body of the agreement we have eliminated that by putting in "On above goods." That makes two spaces fewer for the salesmen to fill in. We find it is hard enough to get them to fill in everything so we make as few as possible.

Mr. Clark: (Kitchener) I would like to ask Mr. Mickler in regard to the return of goods taken out of the smaller municipalities that don't go in for supplies to any extent. Certain supplies are used in construction and are taken out and perhaps not returned for several days. The trouble seems to be to keep proper return records of the articles which were actually used and returned with a minimum amount of labor.

I would like also to ask you how often an inventory should be taken or how supplies should be kept so that an inventory can be taken. I think the difficulty of keeping supplies accounts is to keep a proper record of the return of those supplies that are taken out and perhaps kept out for a week or longer and then are brought back.

Mr. Mickler: I think you can adopt practically the same scheme for the handling of construction and maintenance charges as is done with the contract and installment sales; that is, instead of a sales order a work order is made out. There would be a stores requisition made out when the material was taken out and another made out when the material comes back. It simply means a keeping together of these requisitions and entering them all up on the job order. It would be necessary to know what the men are going to do when they take material out, not simply allow them to take a wagon load out and say we are going to work such a street today. It should be known what material is needed for a certain job and then when it comes back the proper entries should be made. These things are not lost if they are remembered.

As far as an inventory is concerned, if you keep a minimum amount of stock and keep a proper system of stock records you can take an inventory at any time of the stock on hand. A general inventory should be taken twice a year in small municipalities.

Mr. Garret: (Sarnia) Regarding the installment plan, I would like to know if it is the practice to have the monthly bill take care of the installments. I don't know whether it is customary in other places.

Mr. Mickler: We think the proper way to collect installments is through the medium of the monthly lighting bill. That means when there is a balance in the installments you can't very well pay your lighting account without paying the other. The teller should have instructions that he has no authority to change any bill. This can be carried out better where the teller is separate from the rest of the office. The manager is not around and the teller has no authority to change the account so there is nothing to do but pay it.

Mr. Shearer: (Smith Falls) We undertook in starting our appliance department to use the system of separate accounts for the installments, but we found the same difficulty as a great many have found, the customer would bring his lighting account with him but forget all about the installment account. We therefore arranged our bills to include the installment account with the lighting account. Just between the net amount of the lighting account and the arrears line we made a provision for an entry there of the first, second, third or fourth, as the case might be, payment of sales slip number so-and-so. That is added in first and then the arrears added to the net amount which makes the total bill. There is no opportunity of getting a receipt for the lighting account until the installment account has been paid. This plan has worked out very satisfactorily and we have had no trouble to collect the appliances accounts.

Mr. Jackson: I would like to ask Mr. Mickler whether the form of lien note he suggests can be discounted at the bank.

Mr. Mickler: The lien law says that a lien note is an ordinary promise to pay, and if a note is given for value I don't see why it wouldn't be accepted by the bank. Of course, that would be up to the bank. It is a note, and I don't see why because it is just a piece of paper that a man has signed his name to that it is not just as good as a lithographed form of lien note. I would judge it would be as good as a promisory note, that is, on the installment plan.

The Harvey Hubbell Company of Canada, Ltd., have issued a folder descriptive of Hubbell standard plug receptacles. It points out that Hubbell plugs and receptacles were the original interchangeable line and were so designed as to afford absolute safety against shock. Hubbell receptacles are made to take all types of Hubbell interchangeable caps.

Standard Plugs and Receptacles

One of the most important discussions at the convention of the Municipal Electrical Utilities of Ontario, held in Niagara Falls early in June, was that with reference to the adoption of a standard plug and receptacle. Mr. A. T. Hicks, of Oshawa, presented the report and took occasion to state that the sale of appliances and the satisfaction in the use of them by the public had been hindered owing to the confusion caused by the multiplicity of plugs and receptacles. After careful consideration by the committee, Mr. Hicks was authorized to make the following report.

Association of Municipal Electrical Utilities Report of Regulation and Standards Committee

Your committee have endeavored to secure information in view of adopting standard plugs and receptacles. The sale of appliances and satisfaction in the use of same by the public has been hindered owing to the confusion in existing plugs and receptacles. After careful consideration the committee report as follows:

In-as-much as there is no standard practice covering the design of plugs and receptacles for permanent installations, and as there is great need of having plugs and receptacles whose parts are interchangeable, be it resolved that this Committee recommend and adopt the use of receptacles, plugs and plug caps as follows:

1. Receptacles shall have parallel contacts or contacts suitable for both parallel and tandem caps.
2. Plug bases shall have parallel contact or contacts suitable for both parallel and tandem caps.
3. Caps shall have parallel contacts.
4. Contact dimensions of caps shall be as follows: outside, .560; inside, .436; width, .250; thickness, .062.

The report met with the hearty approval of the delegates and was unanimously carried. In answer to a question, Mr. Hicks explained that there were 12 different plugs made by the same number of manufacturers, all of which are now interchangeable. In the discussion which followed, the opinion was freely expressed that local managers in the various hydro municipalities should specify these plugs when they are making their next purchases.

The Committee on Rates

Mr. Perry, of Windsor, who was chairman of the Committee on Rates, made a very interesting report at the recent semi-annual convention of the Ontario Municipal Electrical Utilities, at Niagara Falls. The question has frequently been asked, why a residence with a lighting load of 600 watts should pay the same service charge as the same sized house which may be immediately adjoining but have a connected electric range load of perhaps 10 times the lighting load. Under the existing conditions, the fixed charge in each case would be 30c. At the present time the range load appears to be profitable, but it is easily possible that with the development of this kind of load, the added expense to the municipalities for increased capacity may make the business unprofitable. In Mr. Perry's opinion, it would be wiser at the present time to place the range business on a more profitable basis, so that when the cost of supplying ranges increased, the basis of charge recommended to-day would remain sufficient. For these and other reasons, his committee recommended that where cooking or heating load exceeded 600 watts, in any individual appliance unit, the service charge should be 90c. That is the maximum which is now chargeable under the present system.

The recommendation was discussed by Mr. Yates, of St. Catharines; Mr. Walters, of Napanee; Mr. Stewart, of Toronto, and was finally adopted unanimously.

Benjamin Booklet on Industrial Lighting

The Benjamin Electric Manufacturing Co. of Canada, Ltd., is distributing an attractive catalogue on Industrial Lighting. This catalogue contains practical information and complete data for applying the principles laid down by illuminating engineers as the best practice in the lighting of buildings and areas devoted to industrial uses. Benjamin industrial lighting equipment is made to conform to these principles. In their recommendations its makers have taken into consideration the purposes of good illumination, which are to decrease accidents, avoid wastage, and improve the efficiency of industry. In addition to listing products of the company, the booklet contains a quantity of interesting and valuable information on the progress of industrial lighting, the requirements of correct industrial lighting, the attainment of correct industrial lighting, and general illuminating information, tables, definitions, etc.

To a Salesman

By A F. Sawyer

If you are a salesman and they treat you rough,
Don't try any old Psychological stuff.
Give this a work-out once and awhile,
Just meet all comers with a big round smile.
It may turn into a Cheshire cat grin
When they're treating you rough as sin,
But if you want to sign 'em and bring 'em in,
Smile......

You may go to a prospect to sell a tool;
He may be cranky. Say you are full of "Bull."
Just step in the background and wait awhile,
Then come back with your biggest smile.
As his temper goes up higher and higher
If you don't want to spill the fat in the fire—
Smile......

After you've landed him and he has signed,
And you've left your troubles far behind,
You've won at last after a weary trial,
Believe me, you have a right to smile.
Coming out again, 'neath a glorious sun,
With a deed behind you mighty well done,
You go after the next one on the run.
You've got to Smile.

L'envoi

Sometimes a tough neck deals a hand
That, if you're a man, you cannot stand.
Land on him in your very best style;
While you're landing, keep your smile.
Maul him till his hide is bare,
Give him a black eye—if you can, a pair,
Anyway, leave him so he'll know you were there—
With a Smile.

The Contractor-Dealer

What is the Overhead in your Own Business?

Average of Large Number of Contractors and Dealers Works out 33.5 per cent. Check the Various Items up with Your Own.

In line with the growing tendency to analyze and learn just what is the "cost of doing business" the Society for Electrical Development has been gathering data which will be of interest to our readers.

Figures were obtained from a number of contractor-dealers located in all sections of the country. Practically all companies who reported operate a combined business—both contracting and retail merchandising. The companies reporting ranged from those doing an annual business of $40,000 up to those doing a $100,000 yearly business. While undoubtedly the methods of accounting varied, there was enough similarity in the figures to denote a "tendency."

We give here an "average report" which has been compiled from the percentages given for each item. For example: The item of 22.2 per cent. of total sales representing amount paid for Salaries and Wages is the average proportion paid by all companies reporting. Some reported the amount paid for Salaries and Wages as but 8 per cent. of gross annual sales; others figured this item as high as 32 per cent.; a few did not include it at all.

Average Expense Items

Items	Percentage of Total Sales
Salaries and Wages	22.2 per cent.
Rent and Heat	2.7 per cent.
Light and Power	.5 per cent.
Depreciation	.5 per cent.
Insurance	.6 per cent.
Taxes	.7 per cent.
Interest	1.4 per cent.
Postage, Telegraph & Telephone ...	.4 per cent.
Stationery and Printing	.5 per cent.
Advertising	2.0 per cent.
Supplies	.1 per cent.
Cartage and Delivery	.6 per cent.
Association Membership	.2 per cent.
Bad Debts	.5 per cent.
Gratuities and Miscellaneous	.6 per cent.
Total	33.5 per cent.

It would appear that this figure of 33.5 per cent. should represent the "overhead" or "cost of doing business" of the average electrical contractor-dealer who would come between the limits above mentioned. Nevertheless, this figure should not be accepted arbitrarily!

Average figures such as this should be used only as a guide—as a check on your own figures, which you positively must know to safely conduct a business.

Let us see why the above figures may mislead.

First consider the item of "Salaries and Wages." Some have divided that item into "Productive" and "Non-productive." From the small percentage noted on some reports it is evident, too, that some dealers have not included all—perhaps the proprietor has omitted his own salary. In one or two cases the item of "Salaries and Wages" was blank! In any event, the difference in methods of accounting will make sufficient variations to affect the average.

Another interesting point, and one which might well affect the size of your pay-roll, is the relation between Advertising Expense and Salaries. It was noted that in many cases where advertising cost was unusually low, salaries were unusually high. The report showing the lowest percentage expended for advertising also showed nearly the highest percentage paid for "Salaries and Wages." The total cost of doing business in this same case, too, was well above the average. It would seem that there might be a reason there for spending a little more on advertising—particularly when one considers that the difference between advertising expense and salary expense is so great.

Another point to keep in mind in considering these average figures is this:

The cost of doing "X" amount of business with an invested capital and overhead represented by "Y" dollars varies materially if the amount of business done be multiplied by two. Again it is not sufficient to say that it costs a certain sum to conduct a given business unless it is also known whether that business is progressing or losing ground.

Figures Indicate Change Since Pre-War Days

The most accurate figures available up to 1917 seemed to indicate that the cost of conducting a retail electrical business averaged somewhere around 28 per cent. Assuming that the present average figures are as indicative of conditions as were those of 1917, it certainly appears that the relative cost of carrying on a business has increased. If you are still assuming that this percentage in your business is the same as before the war it will certainly be wise to investigate and find out for certain whether your assumption is right or wrong. In fact, an annual verification of such figures should be made.

It was evident from the reports received that methods of accounting varied greatly. Some omitted the item of "Interest" entirely others figured their expense as a percentage of cost; some included items for "General Expense" and Maintenance on Appliances"; a few included "Catalog" in "General Expense", although the majority evidently considered that item as belonging in the "Advertising" group. Until a uniform system of accounting is more generally used it will be difficult to arrive at a figure which will be really an average. Even then the volume of business, local conditions influencing costs, and many other items will operate to affect the "Cost of Doing Business" in every individual case. The safe and sure way is to adopt a thorough system of accounting, know your own costs and then, if you will, check them against figures like the above.

Improvement to Toronto Store—Comfort and Utility Assured

Messrs. McDonald & Willson, of 347 Yonge St., Toronto, Ont., have recently completed alterations which without doubt, will prove a valuable asset. They have taken over the two floors above their store, and fitted them up for various purposes helpful to their business.

A large room on the first floor has been turned into a demonstration room for electrical appliances and fixtures. Here the customer can investigate the good points of washing machines, vacuum cleaners, portable lamps, and the very latest designs in fixtures. Outlets are conveniently placed so that any appliance can be set working at a moment's notice. Three rows of fixtures with individual switches, hang from the ceiling. The portable lamps are displayed on small round tables and can also be illuminated. For the comfort of customers there are several basket chairs while two or three fans prominently placed can be set in operation and a cool breeze assured on hot days. The floor is carpeted and the walls and woodwork tastefully decorated. Part of this floor has been partitioned off, forming two comfortable offices for the president and vice-president, respectively.

All the rooms on the top floor are for office purposes except one, and that has been fitted up for a lunch room for the girls employed on the premises. It contains a lounge, several easy chairs, a table and small stove. Such a room is a credit to any firm, for besides the convenience, it tends towards better service. Instead of rushing off to some crowded restaurant, hurriedly eating their lunch and then wandering aimlessly along the streets, the girls can take their lunch quietly in this room and at the same time rest. The presence of sewing material and pieces of embroidery explain how the girls utilize part of their noon hour. In consequence this firm will get much better results from the girls, who are able to go back to their work refreshed.

The remaining three rooms are utilized for purposes not immediately connected with the main store. One is used as a studio, where the fixture designer does his work. Another is occupied by the manager of the appliance department who has charge of two branch stores and a crew of canvassers. The remaining room is a general room, used as an office for the appliance department clerks, and the canvassers. This latter is a large office and is fitted up with a blackboard, by the aid of which the manager, or someone detailed by him, lectures from time to time to the canvassers, and in every way seeks to fit the men to make the best use of their time and opportunities. All rooms are decorated and comfort along with utility assured.

The Play as Means of Advertising

An electrical contractor dealer may not agree that a departmental store should handle electrical merchandise, but he must admit that very often they lead the way in good advertising. This is to be expected to a certain degree because they have the money to spend on this means of bringing home to the public the need of the merchandise they handle.

A prominent store of this kind recently carried out successfully a rather novel method of demonstration. In reality it was the ordinary demonstration developed into a play. A room was fitted up as a theatre, with stage and seats, and, in addition, on either side of the room a number of booths, each fitted up for ordinary demonstration purposes. The play attracted a great deal of attention and along with the demonstrations in the booths, netted quite a number of immediate sales.

A young lady with modern ideas was represented as keeping house for an uncle who was very conservative in his attitude towards up-to-date methods. Until the arrival of his niece, and for months afterwards, he would spend no money on any of the appliances which lightened the burden of housekeeping. The niece, however, immediately set to work to change this attitude, aided by a servant. Eventually they succeeded in introducing electrical appliances, and at the end of the play almost every known electric labor saver was installed.

Such methods may not be practicable with the smaller electrical stores, but some of the larger stores might adopt the idea under different circumstances. For instance there are times when a nearby store is vacant and this could be rented for a week or so to good effect. The expense of producing such a play along with demonstrations would not be great because most of the material needed could be taken from stock. Most salesmen and women would consider it fun to enter into such a scheme, so that the time taken to arrange and carry out everything, a little display, rent for store, and a little publicity in the newspapers would be about all the expense. Two or three stores might cooperate in a scheme of this sort. At any rate it is clear that if the contractor dealer is to win out in his competition with the departmental store he must create greater publicity, meet them on their own ground and beat them at their own game.

The Washing Machine Growing in Popularity

In spite of the many obstacles which rise up from time to time to interfere with the increasing popularity of the electric washing machine, it continues to forge ahead, as the great demand for this labor-saver signifies.

Increased cost of production means increase in retail prices. Shortage of material and strike troubles interfere with production and, therefore, quick delivery to jobbers and retailers. The high cost of living prevents many from buying extras for the home even though such extras are of economic value in the long run. These and many more are the things which militate against the sale of electrical appliances.

But if this is so the testimony by jobbers and dealers of the steady increase of sales give some idea of what might be done in this field of electrical merchandising if such obstacles did not exist.

The Central Electric Co. of Toronto, Ontario agents for the A.B.C. washing machine, say that they have a tremendous sale for the washer, and that their only trouble is to get quick delivery. One firm in California sold 10,000 machines last year. and yet, in spite of obstacles, the manufacturers are shipping them not merely in carloads, but in trainloads. Nor is this the only firm turning out such large numbers, for almost every firm has the same story to tell.

Advertising Makes for Success

Undoubtedly advertising has much to do with the great demand and it is evident that the manufacturer who spends the most money in judicious advertising gets the best results. This is evidenced by the statement of one jobber that the only advertising done by his firm was through the travellers. The travellers state that they found the machine they were selling had already been so widely advertised in newspapers, trades journals and periodicals by the manufacturers that it was already well known before they began to introduce it. Both large and small retail firms make similar statements, that the majority of their customers had already seen the manufacturers' advertising before being approached, and that all that was needed was a demonstration.

An unusual washing machine story that is vouched for was recently related of a gentleman who purchased a machine for his wife when both the wife and family were prejudiced against it. So great was this prejudice that they would not even go into the basement to examine it. Nothing daunted the husband did the washing himself the first week. Shortly afterwards he was called away on business and did not return home for some weeks. While he was away circumstances happened which literally forced the family to use the washer with the result that when he returned he found that the machine had converted the whole family, and none of them were willing that it should be returned to the dealer.

One successful dealer remarked that a machine once introduced into a home usually stays there. By this he meant that if several dealers, each handling different types of washers, were all trying to sell their machine to the same lady, the dealer who was willing to place a machine in her laundry for trial rarely had to take it away again.

So far as the popularity of one make of machine over another is concerned, the machine with the least number of parts appears to be the favorite. This is readily understood because the average woman does not understand machinery and is, therefore, prejudiced against anything for the home which appears to be complicated.

One other important point experience seems to teach is that the greatest success is gained by those who take the machine to the customer either by canvassing, telephone or pamphlet. While it is true that some dealers have had good success by simply selling from the store and making no effort to reach those who never enter the store, they would undoubtedly have sold more if they had gone out after business.

The Illuminating Engineering Society's Committee on Education is now preparing and arranging for publication a correspondence course on Illuminating Engineering. This course will be distributed through existing correspondence schools, and through universities conducting extension courses. Professor F. C. Caldwell, of the Ohio State University is chairman of the Committee on Education.

The Portable Lamp Important in Electrical Merchandising

Growing Demand for Lamps with Glass Shades—Should Harmonize with Furniture

The evolution from the shaded kerosene lamp to the present up-to-date electric portable lamp has been a rapid one and from all appearances will continue so. There was a time when the advantages of artistic effect as a means of inducing sales was very lightly considered, but such is not the case in these days of scientific salesmanship. Nothing is left to chance, every phase of appeal is considered and a wide scope is open to original genius in the field of electric lamps.

So far as effect is concerned the shade of a lamp is one of the most important features of its design, and this has been taken advantage of by manufacturers to increase the sale of their products. The silk shade with fringe was featured for some time and is still almost the only style used with stand lamps. With portable lamps, however, there is a big decrease in demand for the silk shades and they are being replaced by glass shades of many styles and colors. One firm recently made the statement, giving approximate figures, that they sell about 500 lamps with glass shades to 10 of those with silk shades and fringe.

One objection to the glass shade is the risk of breakage and consequent expense in renewals. This has been minimized in some designs by adopting a panelled style with a framework of open-work metal. Thus if one panel is broken it can be replaced without the expense of a complete new shade.

Glass shades are designed in various colors, but the mottled amber glass shade is the most popular because it gives a pleasant glow and gives good light for reading. Green has always been considered the color best suited to the eye and with reading lamps is almost the only color used, but it can hardly be considered cheerful, and cheerfulness is what the designers have in mind all the time. This is where the silk shade is the most attractive, for nothing is more appealing, nor gives a greater sense of comfort than the soft, warm glow of a red lamp shade. For this reason they ought to be more popular than they are. No doubt some enterprising manufacturer will make a special

campaign for inducing the public to take up the silk shade again, and for a period we shall see nothing else.

Another class of shade for which there is a growing demand is the decorated parchment shade. It combines the beauty of the silk shade with the utility of the glass shade and with the added benefits of lightness and cheapness—two qualities not to be despised in these days of rush and high cost of living.

Color and art design alone do not make the style of a shade, but is helped out by the shape. The three most common shapes are: the oval; hexagonal and mushroom shape, two of which are shown in the accompanying cuts. There are several other shapes, of course, usually a combination of the three mentioned, but these are mostly among the more expensive lamps. They show more individuality and distinctiveness since more time and thought can be spent on their design and manufacture.

The base of a lamp is also a matter for consideration to the designer, for not only must it not clash in beauty and weight with the shade, but it must also have a distinctiveness of its own. Usually the base of a lamp is designed to harmonize with the various styles of furniture in vogue at the time. With the heavy class of furniture a heavy portable lamp base gives the best appearance, and the light base with the light furniture designs.

Without doubt the portable lamp is both a utility and an ornament, the latter whether the lamp is lit or not.

The Sterling Electrical Company has been formed with head office at St. Catharines, Ont., to carry on the business of engineers and contractors, industrial installations, machinery and apparatus repairs, etc. The personnel of the firm is Mr. W. Mackenzie and Mr. E. A. Dodington. Mr. Mackenzie has been construction engineer in charge of outside trouble and installation work with the Canadian Crocker-Wheeler Co. for the past eight years. Previous to that time he was employed as electrical superintendent by the Canadian Sheet Steel Corporation, Morrisburg, Ont. Mr. E. A. Dodington was one time plant electrician for the Canadian Crocker-Wheeler Co. and later was attached to their construction department.

A new power house is being erected for the Rev. Grey Nuns, at their hospital, Calgary, Alta.

Novel Prize Contest During June and July

Leading electrical and other dealers are invited to enter a novel contest involving prizes to the aggregate amount of $10,000, beginning June 1st until August 1st. This will be part of the nation-wide contest staged by the manufacturers of the Eveready Daylo, the light that says "There it is!" Beginning June 1st dealers throughout Canada and the United States are displaying in their windows the new Daylo contest picture. This picture has no title, but it tells an interesting and human story. Contestants will study the picture and then write on a contest blank, which can be procured free from the dealer, what they think the letter in the picture says. The best answer will draw a prize of $3,000 in cash, and there will be 103 other prizes of from $1,000 to $10 each making a grand total of $10,000. The answers will be judged by the editors of Life, and if two or more contestants submit the identical answer selected by the judges for any prize, the full amount of that prize will be paid to each. Because of the fact that the picture may be interpreted in many different ways and that any number of answers may be submitted, the contest will offer a big opportunity for the public to exercise its imagination with the possibility of cashing in.

Suggestions for Advertising Fans

There are numerous ways of advertising and the majority of them have been talked about time and again, but there is no harm in a reminder, for sometimes we are apt to forget even the most important things.

Here are twelve suggestions for advertising fans, apart from the window display

Group I—Printed Advertising

1. Short, pithy, pointed ads. in the best newspapers if the store is located in a down-town section, but if in the suburbs it would be as well to advertise in a local paper.

2. Small pamphlets giving a brief outline of the value of a fan in the home, or place of business, and the salient points of the particular make of fan offered for sale.

3. Stickers to attach to parcels ready for delivery. These would have a greater appeal if printed in the form of a picture of the fan in use.

4. Pointed statements or cut of a fan, on business envelopes.

5. Theatre, concert and sociable programmes.

6. Poster cards in street cars, and

7. Menu cards in hotels, restaurants and for special dinners.

Group 2.—Demonstrations

8. Loaning fans to public and private banquets, with small sales cards attached bearing various statements such as "If you are hot and this fan is not running turn the switch and appreciate comfort. Loaned by Blank Bros, Electrical Dealers, Main St."

9. Place a fan in the store entrance, and have it running so that shoppers who pause to look in the window may feel the breeze.

10. Have one or more running in the store so that customers may feel more comfortable when making their purchase. Attach a price tag. Arrange with a few dealers, who are not electrical vendors, to place a fan on their counters with card bearing address of the electrical store.

Group 3.—Other Methods

11. Posters on delivery vans are very valuable as advertising mediums because they are always before the public eye. The dealer's own van can always be used for this method, but if he can afford it arrangements made with express men would not be very expensive, but would be effective. Such advertising needs to be very brief, such as "Fans at Blanks, Church St. Phone—.

12. Good results can often be obtained by sending personal letters suggesting that the person addressed give a trial to an electric fan.

Plenty of life and originality is necessary in the advertising of to-day, because there is so much of it, and only the attractive, novel ad. will entice people to spend time reading it unless they are especially looking for something of the kind.

Mr. Frank T. Groome, distributor for the Trumbull-Vanderpoel Electrical Manufacturing Company, is distributing a folder describing this company's latest types of safety switches. The folder emphasizes the safety features of these switches; all fuse clips are dead when the switch is "off" position; switch cannot be closed until door is closed; door cannot be opened until switch open; both line and load are disconnected from fuse clips when switch is open; it is quick break, positive make, and has self-adjusting contact; it may be locked open, or fuse compartment alone may be locked, permitting operation of the switch; it is compact, permitting application directly on motor-driven machines, where space is limited.

A Dealer Who Has an Eye to Improving His Store

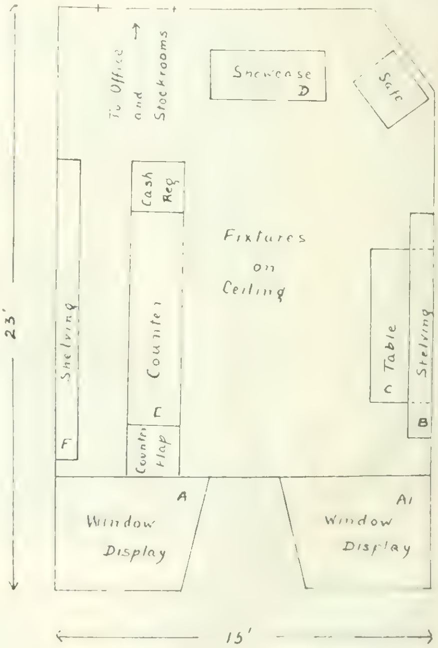
A steady improvement in store equipment as business warrants is the motto of Mr. P. J. Dunn of 3150 Dundas St. W., Toronto, Ont. To this end he is always on the lookout for some new suggestion which will enable him to display his merchandise to the best advantage.

The layout is as follows:

A & A 1—5 ft. front, 6 ft. back, x 4 ft. 6 in. deep
B —9 ft. x 10 ft.
C —6 ft. x 2 ft. 6 in.
D —4 ft. 6 in. x 2 ft.
E —10 ft. 6 in. x 2 ft. At E 2 ft. x 2 ft. of this is counter flap
F —12 ft. x 10 in.

From.
A 1 to B—1 ft. 6 in.
A 1 to C—3 ft.
F to E—2 ft.
D to wall—1 ft. 9 in.

"B" is a set of four shelves underneath three of which is attached lights with small shades for ceiling fixtures



These can be switched on at any time so that customers who have a preference for certain fixtures with the exception of the shades, can make a choice of shades from those on display.

Mr. Dunn has four other rooms on the same floor, the first of which he has turned into part office, part show room. The second is a stock room, the third is used for assembling fixtures and the last one is where incoming goods are received and unpacked. The basement is used for the heavier stock.

Altogether Mr. Dunn has very useful premises and should he at any time wish to extend his store space no doubt one or more of these rooms could be utilized for that purpose.

Van Dorne Aerial Grinders

Fig. 1 shows a direct-current aerial grinder, with 12 in. extension, manufactured by the Van Dorne Electric Tool Co., Cleveland. This consists of a 6 in. x 1 in. x ½ in. wheel, driven by one 1/2 h.p. motor. It is adapted for all kinds of light grinding around machine shops, drop forge shops, auto body work, dressing off gas and arc welds, grinding body work and grinding off arc welds of window and door sash in passenger car building, grinding castings, polishing bronze and brass signs, grinding and polishing art metal work, etc. Fig. 2 illustrates a 60-cycle alternating current aerial grinder by the same company. This equipment has a 6 in. x ½ in. x ½ in. wheel and a 1/3 h.p. motor. In Fig. 1 the motor housing, extension spindle and end plate are built of steel. In Fig. 2, the motor housing is of aluminum, but the end plate and extension spindle housing, where greater strength is required, are of steel.

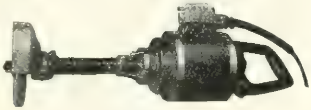


Fig. 1

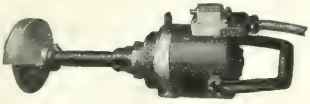
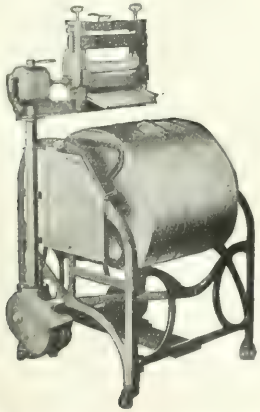


Fig 2

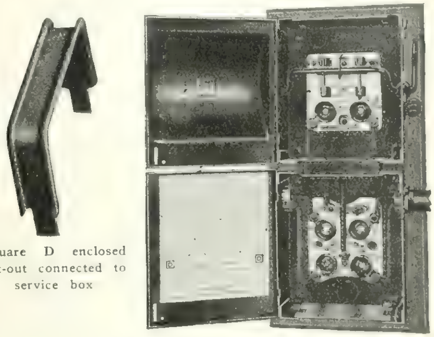
Specially Designed Oscillating Tubs

On account of a specially designed oscillating tub with a raised screen-end incorporated in the electric-driven washer recently placed upon the market by the Surf Manufacturing Company, Milwaukee, Wis., it is said that a surf-like action of soapy water under and over the clothes is produced at the rate of 75 times a minute. Another feature of this machine is easy interchangeability of standard parts. The tub is driven by means of a Westinghouse splash proof motor through gears which assure the positive action of the drive. All of the moving parts are enclosed or protected so that no danger is entailed in operating the machine. By means of a switch on the frame of the machine, the electric energy supplying the motor is controlled and in addition means are provided for controlling the operation of the tub and the 12-in. swinging wringer. For instance the control handle at the top of the diagonal rod allows the starting, stopping and locking of the tub. The wringer control lever is located at the top of the machine near the wringer. A positive safety release and latch that holds wringer rigid in all pisitions is also provided. The motor is prevented from burning by means of a safety clutch on the main driving shaft. The entire washer is mounted on roller bearing casters which makes moving an easy matter.



New Square D Enclosed Cut-Out and Connector

The illustration herewith is the new Square "D" enclosed cut-out, which meets the demand for an enclosed branch circuit cut-out adapted for use in connection with Square "D" switches. The double branch cut-out is arranged for 2-wire distribution from either 2 or 3-wire service. The box is equipped with latch so that it may be locked or sealed shut and is provided with knock-outs so that distributing service may be carried out in the most convenient manner. The use of the special connected endplate permits the attachment of the box to any Square "D" switch, either top or bottom. As the box is made with both ends open, a standard class "A" end plate is always required in addition to the connecting plate. This cut-out is approved by both the Hydro-electric Power Commission and by the Underwriters' Laboratories.


Square D enclosed cut-out connected to service box

Harris and Campbell

A few weeks ago we announced that Mr. J. H. Harris had opened an electrical store at 685 St. Clair Ave., Toronto, Ont. Since then Mr. Harris has taken Mr. Campbell into partnership with him and the firm is now known as Harris & Campbell, electrical contractors. Mr. Campbell was in business for himself as electrical contractor before the war, but gave up his business to enlist. He served through the whole period, part of the time with the Engineers and the remainder with the Mechanical Transport.

The following contractor dealers have moved their business to other premises in Toronto, recently:

Mr. W. P. Earle, from 1382 St. Clair Ave. to 1384 St. Clair Ave.

Atlas Electric Co., from 3180 Dundas St. W. to 3120 Dundas St. W.

Mr. P. J. Dunn, from 3124 Dundas St. W. to 3150 Dundas St. W.

The following contractor dealers have given up their stores in Toronto and are specializing in contracting:

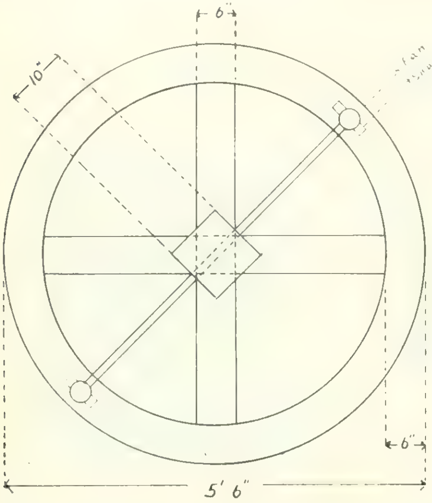
Mr. J. W. Forsyth, two stores, situated at 1128 Dundas St. W. and 173 Roncesvalles Ave.

Salisbury Electric Co., 615 Yonge St.

Economy Electric Co., 1284 St. Clair Ave.

Roller Skates Help to Make an Attractive Window Display

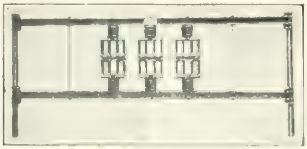
Moving objects in a window attract the crowd more than a window display without movement of any kind, and the Toronto Hydro-electric Company demonstrated this in one of their store windows recently. The display took the form of a wooden circular track six inches in width and five feet six inches in diameter. At each end of a slender bar was attached roller skates and on each skate was an electric fan. The skates rested on the track and the bar was pivotted in the centre. When the fans were set in motion the skates travelled round the track, one apparently chasing the other. This was accomplished by the fans acting as propellers. In the centre of the track and attached to the bar and so, revolving with it, was a box shaped frame covered with a dark colored material and each side bearing an appeal. The four appeals were: Keep Cool Don't Wilt; Get One Now; They're Going Fast.



The remainder of the window was prettily decorated. Across the back was a canvass on which was a picture of a large tree in full bloom. At the foot of the canvass were two boxes containing flowers, and the remainder of the window space was taken up with a display of fans, each one on a pedestal draped with velours. A sketch of the scheme is shown herewith.

Extra Heavy Duty Bus Bar Supports

In large industrial plants, low voltage distribution is often preferred in spite of the fact that heavy currents are involved, requiring great amount of copper in the main bus bar as well as in the feeders. In such installations particular attention must be paid to the construction and arrangement of busses in order to avoid skin effect in the bars and prevent hysteresis heating of adjacent iron parts, such as I beams or other structural steel. The accompanying illustration shows the arrangement of a 3 phase 60 cycle 8000 ampere bus support in which each phase is built up into four parts, materially reducing the skin effect. The cross beams holding the bus bar insulators are made of manganese bronze to illuminate heating. These supports were installed by H. Newgaard & Company, engineers and electrical contractors for the Corn Products Plant, Pekin, Illinois, and furnished by the Delta-Star Electric Company.



Crystal Electric Washer and Wringer

The Crystal Division Mallory Industries, Inc., Detroit, have issued a very attractive catalog describing, with handsome illustrations, the Crystal electric washer and wringer. The aim of the Mallory Industries, Inc., is "to lighten the burden of womankind" and their creed is set forth in the introductory page as follows:

A new freedom has come into the world; a new freedom born of time, of vision and practicability. To enhance the social and political liberties of American women by the more precious freedom from long hours of drudgery, a great organization has devoted its efforts and its resources to producing labor saving devices for the home. "To lighten the Burden of Womankind" is more than the thought which lies back of the Mallory Trademark—it is the inspiration which beckons higher and higher the spirit and craftsmanship of every Mallory artisan. That each Mallory product shall be worthy of the seal it bears is the solemn covenant to which all the Men of Mallory have pledged themselves.

Westinghouse Officials Decorated by the Emperor of Japan

On May 12 the Emperor of Japan decorated with the Order of the Rising Sun Mr. E. M. Herr of Pittsburgh, president of the Westinghouse Electric & Manufacturing Company, and Mr. L. A. Osborne of New York, President of the Westinghouse Electric International Company. These manufacturers have been several months in Japan studying Oriental industrial conditions. The company which they represent has always had close relations with Japan and has supplied that country with a great deal of power machinery. It has also undertaken the training of a number of Japanese students at its works. The Order of the Rising Sun is the highest honor the Emperor can bestow. Mr. Herr received the third-class and Mr. Osborne the fourth, the higher classes being awarded only to Japanese national heroes.

Personals

Mr. W. C. Mainwaring, district sales manager at Vancouver, for the Northern Electric Company, Limited, was married on Thursday, June 3rd, to Miss G. M. Latta, at Vancouver. The young couple left immediately for a six weeks tour of the east, which will include a visit to Montreal, Toronto, New York and other eastern cities, with a stop at Winnipeg en route home. Mr. and Mrs. Mainwaring received a host of congratulations from their many friends in the city.

Mr. J. E. Kearman, electrical contractor, fixtures and supplies, who has a store at North Devon, N. B., is going to open an additional electric store at 87 Regent Street, Fredericton, where he will also carry an up-to-date stock of fixtures and supplies.

Mr. W. D. Boone, electrical contractor, has opened an electrical store at North Devon, N.B., and will carry an up-to-date stock of fixtures and supplies.

Current News and Notes

Brandon, Ont.

The Canada Gas & Electric Corporation have been ordered by the Public Utilities Commission at Brandon, Man., to ground all their secondary wires in that city.

Calgary, Alta.

W. H. Cawston, 2-6th Ave. W., Calgary, Alta., general contractor for the new women's hostel on 4th Ave., Calgary, will sub-let the electrical work.

Cap De Le Madeleine, Que.

P. Lacroix, Pont St. Maurice, Que., has been awarded the contract for the electrical work on 18 new residences at Cap De La Madeleine, Que.

P. Rochon, 84 Royale St., Three Rivers, has been awarded the contract for the electrical work on two terraces of houses at Cap De La Madeleine, Que., for the St. Maurice Paper Co., of that city.

Elmira, Ont.

Wm. Rahn, Elmira, Ont., has been awarded the contract for electrical work on the new Bank of Canada branch, at the corner of Arthur and Church Sts., Elmira, Ont.

Fort Saskatchewan, Alta. N.

A by-law has been passed at Fort Saskatchewan, Alta. N., for the installation of an electric lighting system.

Holdfast, Sask. S.

J. J. Daoust, Ltd., 259 Provengher, St. Boniface, Sask., general contractor for the new R. C. church at Holdfast, Sask. S., wants prices on electrical fittings and supplies.

Halifax, N. S.

The Nova Scotia Tramways & Power Co., Halifax, N. S., have received permission to raise the fares on their street cars. The new rate is seven cents and will continue so for two years after which consent for future rates must be obtained.

Messrs. Arthur & Conn, Argyle St., Halifax, N. S., have been awarded the contract for the electrical work on the new Presbyterian church on Windsor St., Halifax.

West Kildonan, Man.

The Sutherland Construction Co., 301 Merchants Bank, Winnipeg, Man., general contractors for the new school at West Kildonan, Man., wants prices on electrical material.

East Kildonan, Man.

The Ft. Garry Construction Co., 4 Monadnock Bldg., Winnipeg, Man., general contractor for the new school at East Kildonan, Man., wants prices on electrical supplies.

Kitchener, Ont.

The electrical work on the new additions to the King Edward school at Kitchener, Ont., will be let.

Casper Braun, King and Water Sts., Kitchener, Ont., general contractor for the new additions to the Philip Gies foundry, Kitchener, will sub-let the electrical work.

Jas. Valentine, Park St., Waterloo, Ont., contemplates erecting 10 residences at Kitchener, Ont., and will let the electrical work.

The Canadian Consolidated Rubber Co., Kitchener, Ont., are erecting 200 residences at Kitchener, and will let the electrical work. Architect, A. A. Copeland, c/o Dominion Tire Co., Kitchener.

Merritton, Ont.

The Clifford Electric Co., Ontario St., Merritton, Ont., have been awarded the electrical work on the new school at Merritton.

Montreal, Que.

The C. P. R. will erect 9 factory buildings at the Angus Works, Montreal, Que., at a cost of $1,000,000. The electrical work will be done by their own staff.

John McGregor, 511 St. Catharine St. W., Montreal, Que., general contractor for the new power house of the Canada Steel Foundries, Ltd., Montreal, will sub-let the electrical work.

The Berliner Gram-o-phone Co., Ltd., St. Antoine St., Montreal, Que., are erecting a new power house at their plant.

The Atlas Construction Co., 37 Belmont St., Montreal, Que., general contractors for the new theatre on St. Catharine St., Montreal, will sub-let the electrical work.

A. L. Allard, 162 Mount Royal Ave. E., Montreal, has been awarded the contract for electrical work on the new theatre, Papineau Ave., Montreal.

Messrs. Collyer & Brock 131 Alexander St., Montreal, Que., have been awarded the contract for electrical work on the new Devonshire St. school, Montreal.

Messrs. Vincent & Say Electrical Co., 351 St. Antoine St., Montreal, Que., have been awarded the contract for the electrical work on the new branch of the Royal Bank of Canada, at the corner of Bernard and Park Aves., Montreal; also for a new branch on Wellington St., Montreal, for the same firm.

Oshawa, Ont.

The Toronto Electric Contracting Co., 452 Bloor St. W., Toronto, have been awarded the contract for the electrical work on the new manufacturing plant of Oriental Textile Ltd., at Oshawa, Ont.

Ottawa, Ont.

The Marchand Electric Co., Bank National Bldg., Ottawa, Ont., have been awarded the contract for the electrical work on the Rigaud St. branch of the La Banque Nationale, at Ottawa, Ont.

Ponoka, Alta. N.

The Provincial Government Department of Public Works are building a new asylum laundry at Ponoka, Alta. General contractor, H. G. MacDonald, will purchase electrical fittings and supplies.

Pembroke, Ont.

The contract for the electrical work on the new hospital at Pembroke, Ont., has been awarded to Mr. Daly of that town.

Powell River, B. C.

The Jenkins Electrical Co., 539 Main St., Vancouver, B. C., have been awarded the contract for electrical work on 21 cottages at Powell River, B. C.

Red Deer, Alta.

The Western General Electric Co., Red Deer, Alta., are building a dyke across the river north of the powerhouse between the town intake wells and the C. P. R. embankment. The purpose of this is to prevent any possibility of their power plant being held up during the abnormally high tides of the Red Deer river, which are caused by the melting snow in the Rocky Mountains.

Shelburne, Ont.

The local hydro commission at Shelburne has been notified that electric current rates have been raised from $30 to $38 per horsepower.

Sherbrooke, Que.

Wiggett's Electrical & Supply Co., Strathcona Sq., Sherbrooke, Que., have been awarded the contract for the electrical work on the new bottling works, Sherbrooke, Que.

The Electrical Supply & Repair Co, 71 Wellington St., Sherbrooke, Que., have been awarded the contract for the electrical work on houses in the model city, Shtrbrooke, Que.

Sarnia, Ont.

The contents of the Smith Electric Co's. store on Front St., Sarnia, Ont., were recently damaged by a fire which broke out in the premises of the Reliable Repair Co., next door.

St. Boniface, Man.

The Gunn Construction Co., 317 McIntyre Blk., Winnipeg, Man., general contractors for the new packing plant of the Farmers Packing Co., St. Boniface, Man., wants prices for electrical fittings and supplies.

St. Michel Des Saints, Que.

Alexandre Menard, St. Michel Des Saints, Que., wants to get in touch with electrical engineers, with a view to installing an electric light system in the town.

St. Catharines, Ont.

A. B. Cudney, 22 Thomas St., St. Catharines, Ont., has been awarded the contract for the electrical work on 8 new residences at St. Catharines, Ont.

Messrs. Newman Bros., 75 St. Paul St., St. Catharines, Ont., general contractors for the new factory of the Dominion Canners, Ltd., at St. Catharines, Ont., will sub-let the electrical work.

F. W. Wilson, c/o Lincoln Construction Co., Ltd., Niagara St., St. Catharines, Ont., general contractor for the new factory of the Ajax Wire Wheel Corp. of America, will sub-let the electrical work.

Toronto, Ont.

The Canadian National Carbon Co., Ltd., have commenced moving from their present location on Adelaide St. W., Toronto, to their new factory and offices at Hillcrest Park, Toronto.

J. E. Myers, 4 Gould St., Toronto, Ont., has been awarded the contract for electrical work on the new Bank of Nova Scotia branch at the corner or St. Clair Ave. and Avenue Rd., Toronto, Ont.

Tenders are being called for the electrical work on the new additions to the Dewson St. school, Toronto. Architect, W. F. Sparling, 120 Bay St., Toronto.

James Devonshire, Ltd., 659 Yonge St., Toronto, Ont., have been awarded the contract for the electrical work on the new branch of the Dominion Bank of Canada, at the corner of Dupont and Christie Sts., Toronto.

Virden, Man.

The Manitoba Power Commission, Winnipeg, Man., are calling for tenders for a new power house at Virden, Man.

Vancouver, B. C.

Plans are being prepared for a $30,000,000 power plant at Lillooet, B. C. for the Bridge River Power Co., Vancouver, B. C.

Plans are to be prepared this year for the establishment of a $12,000,000 Hydro-electric plant at Seton Lake, B. C., capable of generating 175,000 horsepower.

The Electric Shop, 12 Hastings St. S., Vancouver, B. C., has been awarded the contract for electrical work on a new $28,000 residence on Selkirk Ave., Vancouver.

Plans are to be prepared this year for the establishment of a $12,000,000 hydro-electric plant at Seton Lake, B.C., capable of generating 175,000 horsepower.

The Electric Shop, 12 Hastings St. E., Vancouver, B.C., has been awarded the contract for electrical work on a new $28,000 residence on Selkirk Ave., Vancouver.

The electrical work on the new synagogue and school of the Hebrew Synagogue Ltd., Vancouver, B. C., will be let.

Walkerville, Ont.

Hiram Walker Sons, Ltd., Walkerville, Ont., are rebuilding their power plant at a cost of $175,000 and will let the electrical work.

Welland, Ont.

L. B. Duff, 93 Merritt St., Welland, Ont., is erecting a business block on S. Main St., Welland, and will let the electrical work.

Windsor, Ont.

C. W. Ripley, 519 Sandwich St., Sandwich, Ont., are building a new foundry on Windsor Ave., Windsor, Ont., and will sub-let the electrical work.

Messrs. Harris & Marson, 81a Parkway Ave., Toronto, Ont., have been awarded the electrical work on the warehouse of the Canadian Fairbanks Morse Co., Ltd., Pitt St., Windsor, Ont.

Messrs. Peter & Geo. Osterhaut, 23 Pitt St. E., Windsor, Ont., will let the electrical work on their new store and office building on Quellette Ave., Windsor, Ont.

Winnipeg, Man.

Tenders will be received by the Manitoba Power Commissioner, J. M. Leamy, Winnipeg, until noon, July 7th, 1920, for supply of two Semi-Diesel engines for direct connection to A.C. generator. Specifications with chief engineer, Parliament Bldgs., Winnipeg.

Messrs. Carter-Halls-Aldinger, Ltd., Winnipeg, Man., general contractor for the new business block on the corner of Portage and Donald Sts., Winnipeg, wants prices on electrical material.

The business section of Winnipeg has adopted the automatic telephone system. It went into operation at midnight Saturday, June 19th. The residential section of that city will also adopt the system shortly.

Messrs. Breen Motor Co., Winnipeg, have been awarded the contract for the electrical work on the new Consolidated School, Winnipeg, Man.

The Curtis Construction Co. Ltd., 407 McArthur Bldg., Winnipeg, have been awarded the contract for erecting 25 to 50 houses at Fort Rouge, Winnipeg, and are calling for tenders for the electrical work.

Messrs. Hazelton & Walin, 609 Elec. Rly. Chmbrs., Winnipeg, are the general contractors for the new theatre on Donald St., Winnipeg. They will sub-let the electrical work at once.

The provincial government of Manitoba are erecting a new power line from Plum Coulee to Manitou, Man.

Woodstock, Ont.

A. J. McKinney Lumber Co., Ingersoll Ave., Woodstock, Ont., general contractors for 21 new residences at Woodstock, will sub-let the electrical work.

The Water & Light Commission of Woodstock, Ont., contemplate erecting a new sub-station on the Curtis property, Woodstock. Transformers will be purchased at once.

Wroxeter, Ont.

The Wroxeter town council intend to proceed at once with the installation of a hydro system.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 296 Broadway
CHICAGO - - Room 803, 63 E. Adams St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 **Toronto, July 15, 1920** **No 14**

Government Says "Go Slow" Regarding Radial Construction

An interesting situation has arisen in Ontario with regard to the inauguration of a liberal construction program of electric radials. Sir Adam Beck advocates the purchase of certain existing lines and the construction of others to co-ordinate them all, as soon as possible, into one comprehensive system. The Ontario Hydro-radial Association is also keen to commence operations without delay. As guarantee of the soundness of their proposition the Hydro Commission has also had a report by Mr. W. S Murray, a New York engineer, who approves the scheme in the main.

In the way of the immediate prosecution of the work, however, stands a very stringent and uncertain financial situation, and the Ontario Government is taking extra precautions to ensure that the credit of the province shall not be impaired. All Hydro bonds have been guaranteed by the Ontario Government and though it is argued that the financial status of the various municipalities is so sound as to make the risk of the province having to assume any obligation negligible, the obligation remains, nevertheless, if an emergency should arise. This naturally makes it somewhat more difficult for the province to dispose of bonds for other purposes at as good a rate as might otherwise be the case. All the facts are being taken into consideration by the Drury Government, who have just issued a comprehensive statement covering the situation and stated that a Commission will be appointed to investigate and report on the wisdom of proceeding at once with the work. In taking this attitude, however, the Government makes it abundantly clear that their action must not be interpreted as indicating any antagonism whatsoever towards the radial scheme. The value of a province-wide radial network is conceded. It is merely a question whether the present moment, with the financial, labor and materials uncertainties, is opportune to commit the province to so great obligations.

The Labor Situation and Municipal Ownership

The strike on the Chippawa Canal work which has held up operations on the big power scheme of the Ontario Hydro Commission for some time appears to be about at an end. In assuming the role they did, the men were no doubt led to believe that the need for more power was so urgent that the Commission would grant almost any demand rather than delay construction. There was never any very definite evidence that the rank and file of the workers were dissatisfied, the signs all pointing to the trouble being the result of persistent agitation and interference on the part of a few ringleaders. This being the case, Sir Adam Beck undoubtedly had the support of the province in shutting the work down promptly.

Another strike that came to a much less satisfactory ending was that of the Toronto Railway employees. The general opinion of the citizens undoubtedly was that the men were being fairly well paid. The company, on their part, certainly could not afford to pay any more. The eight-hour day of which much was heard is really only a talking point with the men, the majority of whom do not object to longer hours. The men got a general increase of five cents an hour, but the unfortunate feature of the whole matter was the attitude of the mayor of the city of Toronto who, in efforts to effect a settlement, urged the men to accept the company's offer, as it was only for a little over a year and after that, when the plant would be in the hands of the city, they would be taken care of properly. It is just such blundering utterances as this that make it doubly difficult to carry on municipal operations with any degree of efficiency or economy and that disgust the most ardent supporter of municipal ownership. In these men's mind today there is the thought that they have only to wait for the termination of the franchise when the public chest will be at their disposal.

Thirty-Sixth Annual Convention of the A. I. E. E.

The thirty-sixth annual convention of the American Institute of Electrical Engineers was held at the Greenbrier Hotel, White Sulphur Springs, West Virginia, from June 29th to July 2nd. Nearly three hundred delegates were present, those from Canada including E. T. J. Brandon (H.E. P. Com. of Ont., Toronto), Ashton B. Cooper (Can. Gen. Elec. Co., Toronto), E. T. Driver (British Aluminium Co., Toronto), H. B. Dwight (Can. Westinghouse Co., Hamilton). C. W. Hookway (Can. Westinghouse Co., Toronto). Wills MacLachlan (Toronto), D. A. McKenzie (H. E. P. Comm. of Ont., Toronto), John Morse (Shawinigan Water & Power Co., Montreal), John Murphy (Dept. of Rys. & Canals, Ottawa. and P. E. Hart (Toronto Hydro System).

Situate in the heart of the Allegheny Mountains the Greenbrier was admirably suited for the combined programme of technical sessions and social events. The mornings were devoted to technical matters while the afternoons were given over to golf and tennis tournaments, automobile drives, etc., with afternoon teas for the ladies. Mention should be made of the prominent part taken by Canadians in both tennis and golf tournaments.

The convention opened on Tuesday morning with an address by President Calvert Townley which dealt with an engineering analysis of the labor problem. President-elect Arthur W. Berresford was next introduced and received a very cordial reception to which he suitably replied. This session was concluded by the presentation of the reports of the various Technical Committees, summarizing the main points of the engineering developments of the last year. Although not on the programme the subject of the relation of the A.I.E.E. to other engineering societies was raised and led to an interesting discussion which, however, did not result in any definite decision being reached. The majority of speakers appeared to favor some arrangement whereby the Institute would always retain its original identity but would co-operate with the allied societies in the matter of electrical problems introduced by the other societies.

Five papers on Electrical Machinery were read on Wednesday morning. These dealt with the failures in large turbo-generators and generator ventilation and temperature problems and were followed by good discussions in which the operating details were very ably handled by Philip Torchio of the New York Edison Co. Four papers on miscellaneous subjects were also presented at the same session.

Prof. Karapetoff on the Wednesday evening gave one of his well known piano recitals, which was followed by John Murphy showing films depicting the formation of frazil and anchor ice and the ease with which the formation of the former may be prevented. The same evening there was a Section Delegates conference.

Thursday morning's session covered four protective devices papers mainly dealing with the parallel operation of large generating stations. The annual baseball game took place in the afternoon and proved to be a keenly contested game. In the evening nineteen papers on electrical welding and power factor were briefly presented and discussed but the attendance proved that the morning sessions were more popular.

The technical sessions concluded on Friday morning with six papers on systems of excitation. In the afternoon the tournament and other prizes were presented thus bringing an end to one of the most successful conventions of the A.I.E.E. yet held.

Society for Electrical Development Performing Valuable Service

The Annual Report of the Society of Electrical Development contains the following interesting extracts:

Realizing that the quickest way to commercial success lies through the education of the public, particular attention has been given to this branch of the Society's work; the public has been educated to an appreciation of the service rendered by the utilities and of the many uses of electricity in the store, factory, mill, machine-shop, home and on the farm. This has been accomplished chiefly through articles supplied to newspapers, popular magazines and trade papers.

The Society is recognized as headquarters for information upon electrical subjects and is freely used by them. Not only does the Society supply the articles published in the magazines, but it supplies material to the regular magazine contributors and answers the inquiries received by the editors and referred to the Society for attention.

The chief work accomplished through the women's and architectural magazines is the popularization of electric lighting and electric appliances used in the home. The present popularity of such appliances and the frequency with which the Society's slogan "Do It Electrically" is used shows that the Society's efforts have borne good results.

In the trade journals the use of the industrial motor and proper industrial lighting are being vigorously pushed. A book on industrial uses of the electric motor has been prepared by the Society, but is being held up until motor manufacturers are in shape to take care of the demand which will inevitably follow its appearance. Another book on Industrial Lighting was prepared, and is being rewritten. When finished it will be endorsed by the Illuminating Engineering Society and National Electric Light Association. The Society is arranging with Collier's Magazine for a special Industrial Lighting number to be issued in September.

The Service to the daily newspapers has been steadily maintained, 519 daily newspapers throughout the U. S. A. and Canada are served regularly, and plans are being completed to extend this service still further. The newspapers have recognized the quality and value of the Society's service, covering items of real human interest, articles of educational value, information which is sought and welcomed by their readers, and when by any chance one of the services fails to reach its destination the Society hears very promptly from the editor of the paper.

The Special Service Department is becoming more and more valuable to the members and to the Society as a means of keeping members pleased with the returns they get for their subscriptions. Requests for special service of one kind or another come in every day and the staff in that department is kept busy taking care of them. At first it was difficult to induce members to use this service, but to-day it is the backbone of the organization, almost every member has called for service during the past twelve months and many of them having learned how useful it is to have a staff of experts at their disposal have shown their appreciation by calling upon them over and over again.

Many members have written in to the effect that some one special service rendered has more than earned their year's subscription.

This, in a sense, is backing up and enhancing the Monthly Sales Service, which is the monthly reminder and tangible evidence of membership. The sales ideas and suggestions contained in the Sales Service benefit all classes, and not only those who are engaged in merchandising. The use by dealers of those ideas and suggestions benefits the manufacturer, the central station and the jobber as well as the contractor-dealer.

In a previous report reference was made to the extension of the S. E. D. idea to England and that Japan, Switzerland and Australia were contemplating organizing such a Society. Since then inquiries have come from France, Italy, Belgium, Norway, India, South Africa, Samoa, Mexica, and some of the South American countries, asking for advice, for particulars of organization, etc., while our members in Canada, the Hawaiian Islands, France, Japan, the West Indies and Australia, have asked for and received special service.

The Society has been represented at the principal conventions and many other electrical meetings held throughout the year. Your general manager has addressed Rotarian and other Club meetings upon the general subject of the Electrical Industry, pointing out its importance, its immensity and its growth, emphasizing the service rendered by this industry to the manufacturers in all other lines of business, to the farmer and to the housewife.

Your general manager and other members of the staff have also visited Toronto during the year and secured the active support and co-operation of the leading local electrical interests, including the Canadian General Electric Company with its branches all over the Dominion.

Recognizing the importance of national campaigns to foster and maintain the public interest in matters electrical, and at the same time to secure actual business for the industry, the Society conducted a more adequate outlet campaign and an Electrical Christmas Campaign. The Society provided posters and other advertising material and secured much publicity for these movements, besides rendering local assistance wherever requested. The effect of such campaigns is felt long after the cessation of actual activities.

At this present time, the Society is engaged in a nation-wide membership campaign, special letters, a broadside, a letter from President Freeman and other literature has been sent to non-members throughout the country soliciting subscriptions, and to members asking for their cooperation in this movement.

The following new fares are in force by the Levis, P. Q., County Railways:

Four tickets for 30 cents instead of four for a quarter; fifty tickets for $3.50; ten cents cash fares and eight children's tickets instead of ten for a quarter.

Thinks Switches Are a Hazard

Walkerville, Ont.

Editor, Electrical News:

It appears to me that the point raised in Mr. Cambridge's letter with reference to the hazard caused by placing snap switches on washing machines is very timely. There have been several cases recently in this district of severe and unpleasant shocks being obtained from washing machines, and on investigation these have been in a great many cases traced to defective wiring at the switch located on the machine. In the particular machine to which I have reference the reinforced cord has the outer covering completely cut away and the single pole switch is cut in on the conductor. This leaves the cord very poorly protected, especially as the machine is all metal. Another feature is that the snap switches being used are not in every case of the highest grade and consequently the inferior quality introduces another hazard.

I believe that these switches should be omitted entirely or that some better means of installing the same should be found. It appears to me that a special switch should be developed for this type of work.

Walkerville Hydro-electric System.
M. J. McHenry, Manager.

Powdered Fuel for Central Station Boilers

Mr. H. D. Savage* Before the N.E.L.A. Convention at Pasadena, Outlines the Progress of Powdered Fuel and Claims a Higher Efficiency Than Obtained From Oil. Ash Contains no Combustible.

There are three points upon which I would like to comment, in passing:

First—The stress that is laid by many advocates of other methods of combustion on the excessive cost of pulverized coal installations.

Second—The cost of preparation.

Third—The upkeep.

If a specific plant is taken, and an analysis made, including structural as well as equipment cost, from coal car to ash car, on a continuous developed horse-power capacity, there will be but little difference in the capital expenditure required.

If firing costs are compared from coal car to ash car, the results will not be found far apart, as the dryer and pulverizer are the only two steps in preparing fuel that are not practiced in modern stoker plants today, and are about offset by the less cost to run the firing auxiliaries and the reduced cost of ash disposal.

We realize, however, that here, as in all new developments, there is opportunity for improvement in present methods, and for reduction in cost, so that we now have under way investigations which we believe will be productive of results along these lines; but, even with the present cost of preparation, the new results when using pulverized fuel, will, in most cases, warrant its adoption.

If a similar comparison is made as to upkeep, the balance will be very greatly in favor of powdered coal, as the much-talked-of "destruction to refractories," which did occur with the old type of horizontal burner using fans to blow the coal into the fire box, does not occur in properly designed plants, as there are no metal or moving parts in the fire zone to be replaced.

A question no doubt quite properly occurs here as to why no definite figures are given in substantiation of these claims. General figures relating to the application of powdered coal to steam power plants are extremely misleading, and it has been our practice not to offer same, as each proposed pulverized fuel installation should be treated on its own merits as a separate and distinctive engineering problem, for in each new installation are brought together an entirely new set of elements to produce entirely different desider results, so that any general figures given are, to a certain extent, misleading, and only tend to confusion.

It will, therefore, be the frank purpose of this paper to bring to your attention as briefly and as thoroughly as possible, some results that have been accomplished with "Lopulco" systems for burning pulverized fuel. This system is, I believe, the only system that is today in successful operation in a central station.

The results obtained with this equipment in the Oneida Street plant of the Milwaukee Electric Railway & Light Company are set forth in Mr. John Anderson's very comprehensive paper which your chairman has had distributed here.

There are today, equipped with this system, and in operation, the following plants:

Oneida Street Station, Milwaukee Elec. Ry. & Lt. Co.
  5 Edge Moor boilers, total of 2340 h.p.
Lima Locomotive Works, Lima, Ohio.
  6 Wickes boilers, of 400 h.p. and 1 Heine boiler of 486 h.p., a total of 2886 h.p.
Allegheny Steel Co., Brackenridge, Pa.
  4-333 h.p. Wickes boilers in operation, 6 being equipped.

---

*Pulverized Fuel Equipment Corporation.

Morris & Company, Oklahoma City, Okla.
two 300 h.p. and two 500 h.p. Edge Moor boilers.

The following plants are being equipped with "Lopulco" systems:

Ford Motor Co. ,River Rouge Plant.
four 2640 h.p. each boilers.
St. Joseph Lead Co , Rivermines, Mo.
two 786 h.p. Stirling boilers
Lakeside Plant, Milwaukee Elec. Ry. & Lt. Co.
two 1300 h.p. Edge Moor boilers.
Allegheny Steel Co., Brackenridge, Pa.
two 700 h.p. Stirling boilers and six 333 h.p. Wickes boilers.

There is, we believe, no coal existent in commercial quantities in the United States today from which it is not possible to obtain satisfactory operating results in central station work, when this coal is burned by induction in pulverized form To substantiate this very broad statement, I offer herewith data covering tests of varying periods, made in accordance with A S M E Code, of coals ranging in quality from the graphitic anthracite of Rhode Island to the very high volatile lignites of the West.

These coals, while of no value as fuel when burned by the ordinary methods of combustion, are a thoroughly satisfactory fuel when burned in pulverized form. The difficulty met with in burning this graphitic anthracite coal with ordinary methods is that the ash will not free itself. The coal makes a very brilliant fire for a short space of time, but the lump soon becomes surrounded with ash and is snuffed out. When burned in suspension in pulverized form, combustion is, of course, instantaneous, and this trouble does not exist. The elimination of this difficulty therefore makes it a thoroughly reliable and useable fuel.

[The author here quotes the results obtained from a number of tests made with various low grade coals. A low grade from the Ping Yang district of Korea, of apparently no commercial value, showed an efficiency, boiler and furnace, of 79.46%. Silth and culun from the anthracite district gave 85.01%. Illinois and Indiana coal gave 83.33% and Texas lignite 83.27%.—Editor.]

The high efficiencies that are obtained on tests using pulverized coal may appear hard to explain, in view of the fact that the maximum efficiencies from oil as a fuel are 3 to 4 per cent. lower. If you will take, however, an Eastern coal with a comparatively small hydrogen content, and make up a heat balance in comparison with oil, using the same amount of excess air in both cases, and the same flue gas temperature, you will find that this difference is fully explained by the less amount of heat carried by the moisture in the flue gas in the case of coal. In other words, it is to be anticipated that since, due to pulverization, the combustion with coal will be as complete as it is with oil, the actual efficiency with coal will be materially higher.

The completeness of combustion when burning powdered coal is indicated by the analysis of ash as shown here:

SiO_2	81.60
Al_2O_3	10.04
Fe_2O_3	6.40
CaO	.62
MgO	1.10
SO_3	.10
Carbon	.02

This ash was taken from the ash chamber of a 333 h.p. Wickes boiler, operating at 260 per cent. of its nominal capacity. Some idea of the economies to be gained in industrial plants by the substitution of pulverized coal for other methods of burning may be gained when it is stated that with the previous stoker equipment, the combustible in the ash ran from 30 to 50 per cent.

This, I think, will serve to indicate the wide variety of low grade coals that are available and thoroughly practical for power generation when used in pulverized form. It can be positively stated that no insurmountable operating difficulty of any kind presents itself in burning these coals. Practically all of the coals, tests of which have been shown herewith, are now being used in daily operation for power generation.

While there are but two central stations that we know of, equipped for burning powdered coal, there are a sufficient number of industrial plants producing steam in this method today to have ironed out satisfactorily most of the operating difficulties that formerly seemed inherent in the burning of powdered coal.

Capacities

Very high capacities, with efficiencies maintained, are possible when burning powdered fuel, not for peak moments, but as a continuous proposition.

The "Lopulco" mixing oven furnace consists primarily of a hot zone where the combustion occurs, of a neutral zone, and of a cool zone, air being induced into the furnace in the proper location to carry out the three distinct functions of these zones. One of the apparently inherent difficulties in the early days of burning powdered coal was slag. Through the development of this new process in the art of burning powdered coal this trouble has been entirely eliminated. The slag is simply the ash brought to a temperature of 2000 to 2200 degrees, when it forms a black, glassy mass. By maintaining a cooler zone in the bottom of the furnace, the ash, as it drops out of the combustion area, is brought to a lower temperature, and does not fuse, and is readily withdrawn from the furnace as desired.

While the high ratings that it was expected powdered coal would produce have not been obtained in existing installations, this is not in any way due to the limitations of powdered coal equipment, but is due to the fact that the present installations have all been made in existing plants not built with a view to operation at present permissible capacities, so that either the superheater or the steam outlet area has been so restricted as to prevent the emission of steam at capacity.

The operating conditions in a central station burning pulverized fuel are very much simpler than with any other method of firing. There are but two controls: the rheostat that controls the coal feed, and the damper control. In a plant properly equipped with CO_2 recorders, draft gauges, and pyrometers, it is possible with but slight attention, to keep the boilers up to the utmost efficiency, as the coal being fed is of constant size, as there is no fire bed of varying thickness through which the draft must be forced, and the only draft necessary is that sufficient to overcome the friction losses through the passes. Therefore, it is possible, in removing the products of combustion at all times to control the excess air through the stack damper.

There has been much discussion as to our ability to justify a powdered coal installation as against a stoker installation in a modern central station using high-grade Eastern coals.

It is quite possible that such a station, running at a constant rating, would not show better than 8 to 10 per cent. improvement when equipped with powdered coal, but few, if any, stations run on such a basis.

In a central station with the power-factor from 40 to 60 per cent. a very large saving would be realized during the banked time, as it is not necessary to maintain any fire during these periods, and as the damper and air openings are closed up tight, the fire box acts as a sort of fireless cooker, so that but little pressure is lost and the boiler can be put on the line within the minimum time.

Another feature of powdered coal burning that appeals to the central station operator is the instantaneous response possible to meet peak load demands, as boilers respond immediately to any change desired. This company is now engaged in some very elaborate tests which will cover a period of some three months, and which are being run under the direction of Mr. Kreisinger and the Bureau of Mines. Many of the very natural questions which now arise concerning the combustion of fuel in powdered form, and to which at present we have only a more or less satisfactory answer, will be very completely covered when these tests are finished. There are many problems, of course, arising from the use of powdered coal today, to which no entirely satisfactory answer can be given. One of these is "What becomes of the ash?" I realize that the best answer we have—namely that the Milwaukee Elec. Lt. & Ry. Co. have been operating in the heart of the business section of Milwaukee for practically two and one-half years, burning 150 tons per day of coal containing from 10 to 12 per cent. ash, and that while probably 60 per cent. of this ash goes up through the stack, none of it can be found anywhere in the vicinity of the power plant, nor have there been any complaints of any kind, although the Smoke Inspector's windows look right out upon this stack—is not the answer that can be accepted by a body such as this.

Some idea of the size of the particles of this ash may be gained from the microphotograph which will be thrown on the screen. The scale shown is 2/1000 of an inch in length, and would indicate that the size of the original particle is about 1/1000 of an inch across. This ash is a very fine, white flocculent powder, and the theory advanced by Mr. Anderson is that it remains in suspension in the atmosphere until such time as it is precipitated by moisture.

How the Electrical Industry is Getting Together at Last

At the Recent Pasadena Convention the Committee on Co-operation in the Industry, Outlined the Practical Results That Had Been Obtained in California by Getting Manufacturers, Jobbers, Power Companies and Contractor-Dealers Pulling the Same Way

The Committee is firmly convinced that there exists generally to-day a healthy desire on the part of the electrical manufacturer, jobber, contractor-dealer and central station to join forces in the development of our great industry. It believes that the thoughts of each branch can be directed along lines that shall lead to a wise and proper appreciation of the problems which confront the others, and guided by a sympathetic understanding, that all shall work in harmony to promote the electrical idea through coordinated effort, with the result that the public, which constitutes the court of last resort, shall pass favorable judgment upon their accomplishments.

In a word, the value of co-operation is today being widely recognized. All are coming to see, too, that basic truth, "He profits most who serves best."

Mention should here be made of a number of co-operative movements in the industry throughout the nation. The Society for Electrical Development, to cite an eminent example, has achieved co-operation through the efforts of its efficient staff, and by means of the work which it has incited its members and others to undertake and accomplish. The Jovian Order is another agency intended to promote co-operation in the electrical industry, and in many instances its labors in that direction have been of service. The National Association of Electrical Contractors and Dealers has worked out carefully a complete plan for promoting co-operation—an excellent program which in some ways is quite similar to the "California plan." The Commercial Section of our own Association, operating through its various bureaus and committees, has already accomplished much in the way of co-ordination of effort and has the potentiality to accomplish even more.

In addition to the four national movements cited, much co-operative promotion work has been done by the National Electrical Supply Jobbers' Association, the Conference Club, the various manufacturers' associations and other organizations, both national and regional.

That co-operation between the several branches of the industry is not only desirable, but wholly practicable, has been amply demonstrated in California through the work of the California Electrical Co-operative Campaign. Your committee is impressed with the California plan because it is a plan that for a period of more than two years has produced such tangible, concrete results for the benefit of all that we believe it merits unusual emphasis in this report.

For the present committee to attempt to cover the entire field and to report in detail on all the plans proposed, or even on the several which already have been started, would be a great task. At the present moment, we believe the best results can be gained by a special report on the California plan. With respect to its achievements, the following important facts are submitted:

For several years prior to the beginning of the California Electrical Co-operative Campaign there had been undertaken from time to time similar work along co-operative lines, but the movement did not take root to any considerable extent. This was due primarily to the absence of definite plans and lack of proper organization. These deficiencies were removed by action taken at the convention of the Pacific Coast Section of this association held at Riverside, California, in 1917.

At that conference the subject of co-operation in the electrical industry was introduced during a session of the Commercial Committee. The Pacific Coast Section, it should be noted, includes in its membership a considerable number of manufacturers, jobbers and contractor-dealers, and representatives if all these branches participated actively in the discussion. The definite result was the appointment of a special committee to prepare a workable program of co-operation between all branches of the industry. The plan devised was in due time presented to the Executive Committee of the Section, and after some revision as to the method of administration, was approved.

The plan, as adopted, provided that an Advisory Committee should direct the campaign and that this committee should be composed of representatives of all branches of the industry; further, that two field men should be employed to travel throughout the state for the purpose of interesting central station employees and contractor-dealers in the co-operative idea. A fund of $12,400 to defray expenses was raised by subscription as follows:

Manufacturers	$1,300.00
Jobbers	3,200.00
Power Companies	5,900.00
Contractor-Dealers	2,000.00

Substantial results have been achieved in this campaign of education in California. Formerly there prevailed a pronounced lack of confidence between the various branches of the electrical industry; controversy and misunderstanding were the rule rather than the exception. Continual bickering retarded proper development, with the result that the public failed to secure the full measure of service to which it was entitled, and further, that approval on its part so essential to material progress did not obtain.

The primary object of the work undertaken through the campaign was to harmonize the various interests so that there would be unity of action. Practical co-operation was analyzed to mean doing the thing in the other fellow's way if you cannot get him to do it your own way.

Events have demonstrated the wisdom of this analysis, for today, after two and one-half years of consistent and conscientious effort under the inspiration of the co-operative idea, vastly different conditions prevail in California. Let us then briefly describe the activities that have produced such tangible, concrete results.

The Field men have visited and worked in various towns throughout the State, as directed by the Advisory Committee, and they made regular reports direct to the Committee headquarters as to results.

The Field men have arranged in the important centres joint meetings of all electrical men, for general discussion of their common interests and problems. The Advisory Committee has furnished suitable speakers for such meetings.

The Field men, under the direction of the Advisory Committee, have brought the central station managers and employees into closer co-operation with the contractor-dealers.

The central station manager has as a result indicated to his organization and employees that it is his company's policy to support this campaign.

The greater portion of the Field men's time in the towns, however, has been spent with the contractor-dealers in assisting them in their efforts to improve their business methods. This valuable guidance has included advice on accounting, sales, advertising and general store appearance.

They have shown to the contractor-dealer the dollars-and-cents advantage of the retail side of his business and have encouraged him to give more attention thereto.

They have encouraged the proper arrangement of electrical stores and display windows, particularly by showing photographs of well-arranged stores and windows, and by actively assisting the contractor-dealer to carry out his plans for store improvement.

They have emphasized the advantage of tying in with national publicity campaigns and with central station advertising campaigns.

The contractor-dealer has been encouraged to adopt proper accounting methods, so that today California contractor-dealers have installed more of the National Standard Accounting Systems than have those in any other state.

The Field men have shown to non-members the advantage of membership in the California Association of Electrical Contractors and Dealers, as well as in the National Association and in the National Electric Light Association.

The contractors have been encouraged to use high quality material and workmanship and to employ standard practice methods in estimating cost of installations.

The Field men have caused contractor-dealers to realize the necessity of giving prompt attention to work which they are employed to do, so that there would be small occasion for complaint either from the central station or the customer because of the growing activities of the electrical contractor-dealers in a field of activity formerly covered to a large extent by the central station.

Architects, homebuilders and contractors have been urged to install sufficient outlets for the convenient use of all electric appliances, thus initiating a movement in the industry that today is assuming nationwide proportions.

We emphasize the value of such a co-operative movement and the concrete results in actual values. Whereas discord formerly prevailed, harmony now exists throughout our industry in California. Whereas disorder in stores was once common, businesslike establishments are today found on every hand, and from a canvass of sales made in California, the result shows that 62 per cent. more sales were made in appliances during 1919 than in 1918, in spite of the fact that California even hitherto had been supposed to have reached a "saturation point" in electrical uses, since in California electrical appliances were already in more general use per capita than elsewhere in the nation.

Furthermore, these augmented sales were made in spite of the fact that the average selling prices had increased fully 50 per cent. And let it be noted that while these and many other tangible results can be definitely listed, the intangible effects of this work are of even greater value, even though they cannot always be set down on paper.

Attitude of Central Stations

It is to be emphatically pointed out that the campaign in California has never had as its aim the driving of the central station out of the merchandising business. Many of the central stations have, however, willingly ceased their aggressiveness in sales of electrical appliances as fast as the contractor-dealers in their respective communities have made good in service to the public.

The final test of all work or effort in our industry must be on the grounds of efficiency in service rendered to the public. The records in California are too numerous to fully list here the ways in which service to the public has been advanced through this helpful work. The central station executive has acquired a fuller appreciation of the value of co-operation with other members of the industry; the employee has come to a keener sense of his obligation to the industry whence comes his monthly pay envelope. The contractor-dealer, the jobber and the manufacturer on all sides are now using their influence to give to each other and to the public fair and reasonable explanations of those difficulties and perplexities that beset the industry. Thus has been created a favorable public sentiment that cannot be expressed by figures or set down in words.

The regulatory body of the state has likewise taken cognizance of the co-operative endeavor. Even the universities and colleges have felt its value. Indeed it is difficult to fully follow and point out all the various channels of expression through which its influence is manifested, but to the public the resume of the entire campaign may be set forth in these words of accomplishment: "A better, a more economical and a more satisfactory service."

Your committee therefore recommends that the National Association of Electrical Contractors and Dealers, the National Electrical Supply Jobbers' Association and the Electrical Manufacturers (Associated Manufacturers of Electrical Supplies and Power Club) be requested to appoint members of a committee on co-operation to meet with representatives of the National Electric Light Association. If such plans as are decided upon to be reported back to the mended that National Electric Light Association representatives shall meet with the same to formulate plans for co-operative work (which may include a paid executive staff), such plans as are decided upon o be reported back to the various associations.

Finally, your committee is of the opinion that to obtain the best results, two things are needed; first, local organization by state or groups of states, as may best suit local conditions, to carry on active field work; and second, national co-ordination and co-operation.

The Condition of Our Electric Railways

The Credit of the Electric Railway is Poor When it Ought to be the Very Reverse—Profits Will Never be Large But Ought to be Sure—Flexible Rates a Sound Proposition—The Public Beginning to Realize the Facts

By J. H. Pardee*

The electric railways of this country have suffered during the past three years a particularly severe accident. They have been run over by a long train of economic conditions, war requirement conditions and war price wage and inflation conditions. Some succumbed and passed away almost immediately, others lingered in severe pain for a short time and then gave up and were buried in the Potter's Field of wrecked business, but a great majority have exhibited a strength of will power and latent energy which have up to this time preserved functioning powers. They are scattered about this country in the hospitals of business, undergoing treatment by state commissions, municipal officials and public doctors and nurses of varying degrees of experience and motives.

Lack of credit is the basic cause of the present condition of electric railways and the restoration of credit is the major task of those engaged in the stupendous job of rehabilitating this essential industry. By the term credit I mean credit in its broad sense, the credit springing from resources and stability which attracts capital for expansion and economical operation of business. You will notice that I have used the word "essential" in referring to this industry. This is because all the evidence goes to show that the street railways are an absolute necessity to all American cities of any considerable size and that their function cannot be performed completely or well by any other form of local transportation.

This fact was particularly and clearly brought out in the evidence presented last year in Washington to the Federal Electric Railways Commission appointed by President Wilson; all witnesses of whatever leanings testified that the electric railways were a necessary and indispensable part of the economic and social scheme of our country. It is further evidenced by the action of Mayor James Couzens of Detroit, himself a motor manufacturer and fully familiar with all the possibilities of motor transportation, in inducing the city of Detroit to bond itself for $15,000,000 to be spent, not on motor buses, but in providing electric railway track and equipment.

And if they are a necessity, they must in some way and by some method be continued. There is no lack of those who proclaim in strident voices that the system of private ownership and operation of these roads has broken down under the conditions imposed upon it and that the only salvation for the service is that the state or the municipality shall take them over and operate them. Now, I am not so sure but that, from the selfish standpoint of the owners, public ownership is the easiest way out. I am, however, firmly convinced that from the standpoint of the public it is the worst way. The owner, surrounded by the protection of the law, would be assured of realizing a fair price for his property, and this sum, whatever it might be, could without question be readily invested in enterprises many times more profitable than electric railways have been or have any likelihood of being.

But what of the public? Would it be assured of better service? Would it be assured of more economical and efficient operation? Would it be assured of the development of these local transportation systems in pace with the public requirements? There is nothing in the history of our government to show it. I have just been looking over, with more than ordinary interest, the report of municipally operated electric railways for the year 1917, included for the first time in the Census Bulletin of the United States Bureau. The statistics of some nine roads are given, but the figures for one—and this one is operated by the State of North Dakota and not by any small municality—are excluded in figuring the total because information was not available. Of the remainder, two report no charge because of interest on funded or unfunded debt, and but three report taxes, two in such small amounts as to indicate that they are but a pittance compared with what a privately owned company would have paid, although in each and every case the public treasury is being deprived of a substantial sum through public ownership. And with all of these favorable omissions the eight lines show a deficit for the year of $141,000 out of total operating revenues of $1,682,000, while the ninth road, not included in the total because of lack of information, had a deficit in operating expenses. But two of the nine roads had any net income. In the case of the Tacoma line this paper surplus is accounted for by a "donation" of $5,100 from general taxes and by the failure to include any adequate sum as the road's contribution toward taxes. The famous San Francisco Municipal Railway was among the roads reporting, and, separated from its cloak of municipal ownership propaganda and put into the bald and incontrovertible figures which the United States Census Bureau insists upon, the result of the year's operation shows a deficit of $103,908. Seattle's latest venture, the operation of the city's street railway system, is not among the nine roads. Had it been an even worse showing would have resulted, since the report of the City Comptroller, made at the Mayor's instance, shows a deficit of something more than $500,000 for the first year's operation of this property.

There is nothing here to indicate improved economy and improved efficiency in public operation of electric railways. There is nothing anywhere to show that they are better managed or run at less cost. The truth is that the high cost of labor and materials and of money, which have made it impossible for the privately operated railways to continue to furnish service at the old price, are just as potent in the case of the public operated lines and that the effect of these higher costs is the same in both cases. Because the great majority of railway mileage is privately owned and privately operated the public has in fact been receiving service for a number of years at very much less than its cost. This is obvious. Were the utilities publicly owned the entire investment charge could be represented by obligations of the communities or by obligations secured by the properties themselves, represented by bonds. The interest on such bonds must be paid in some way or a default would result. If revenue was insufficient, then the communities would perforce, if they continued to operate the property, make up the deficiencies from the public treasury. You cannot expend money unless you receive it from somewhere. The old adage is true, one cannot lift himself by his own bootstraps. The private owner has no such recourse. A large part of present capital is represented by stock and not bonds, and when revenue was insufficient the first charge to be lopped off was the owner's return, so that in the case of practically all electric railways return is anything connected with the past but unconnected with the present.

---

*President American Electric Railway Association

It is very evident that there must be a new deal before the investor will again sit in the game. It is not enough to point to the growing number of electric railway companies that have been permitted to increase their fares. These increases have in almost all cases come long after the time when they were first needed and have only been sufficient to meet operating costs. They have been granted to prevent financial and physical collapse of the service. Many of them are possible only through the waiving of contract provisions, and in only a few instances is there any real assurance that they mark a new attitude by the public toward the utility.

Day of Speculation is Past

Electric railway transportation has been withdrawn from the realm of speculation and is now hovering in midair, preparatory, I trust, to a landing in the fields of assured investment. The original electric railway investor took a chance of the loss of his money, because there was nothing in the law of the land, or in the code of business ethics, or in the thought of the public, which denied him the right to enjoy the full profits of the enterprise. He has since been denied the profits but compelled to maintain the risk. The inevitable has followed. Warned by the experience of the original investor, the prospective investor has declined a risk when denied a profit. The development of public utility regulation has been along biased lines. It has operated to squeeze what have become known as undue profits out of the business, but it has done nothing to eliminate the risk. No one now wants the undue profits put back, but it is certain that if investment is to be again attractive the risk must join undue profit in the limbo of forgotten things, and safety of investment and assurance of return must in some manner be provided.

Government securities are non-speculative, not because of any fiat of the Congress, but because they are safe. Similarly electric railway securities cannot be made non-speculative because of any law or ordinance, but must become so because they, too, are safe.

Fare increases are a necessary palliative to keep the electric railway patient alive until his case can be properly diagnosed, the real seat of the trouble located and a cure effected. By themselves they are not enough to restore the industry's credit. The same power, be it a public service commission or be it a city council, which has increased fares can decrease them, and there is nowhere assurance that such decrease will bear any relation to the needs and necessities of the enterprise. There must be a surer foundation for future relations between the public and public utility enterprise than this if private capital and private enterprise are to be retained. Ultimately the inexorable economic laws that govern all industry will prevail, in spite of anything that may be written into the statutes or contained in the pronouncements of commissions. Regulation is good or bad and will be good or bad as it follows or deviates from these economic laws, and it is because they have been violated that the utility is to-day lying supine after a social and financial storm, from which unregulated industry has emerged erect and unharmed. The fundamental error has been in the attempt to fix the price of a product without regard to its cost.

Deteriorated service has been the inevitable result and deteriorated service has led to a state of antagonism between the utility and the public, which is making the problem of readjustment doubly hard.

Flexible Rates of Fare Are Economically Sound

There are to-day in effect on the electric railways of this country more than seventy-five different rates of fare, while for the companies operating under service at cost agreements, there are no two with the same fare. Furthermore, the base upon which the fare structure is erected shows a wide variation. Flat fares, ticket fares, the zone system with its many variations, distance traffic, commutation rates and the wholesaling of transportation are all being tried out and experimented with. Out of these many attempts to find a fare which, while paying the cost of the service, will attract the maximum of riders is coming a mass of information that is bound to make the task before the industry easier. To restrict the companies in their efforts by rigid fare provisions in laws, ordinances or even orders is to end an experiment that I firmly believe will prove to be for the ultimate good of both the public and the industry.

The interest of the public will be furthered and not jeopardized by the giving of this increased freedom of operation which I have urged. There is not and should not be prospect of speculative profits in the conduct of so vital and so necessary a public utility as an electric railway. But there should, in addition to assured returns upon the investment, be a reward for good management and good operation sufficient to attract the best kind of management and merchandising talent to make it worth the companies' while to furnish service and to inaugurate fares that will induce the greatest use of the facility. The fundamentals of the solution of the electric railway problem are simple enough. The capital in the properties entitled to a return must be ascertained by a process which will take into consideration all the various factors that have gone toward making these properties living and useful enterprises. The right of that capital and of capital afterward invested to an adequate and continuous return should be insured by a plan which provides for the recognition of return upon the capital thus ascertained as a legitimate cost of the service, for the right of the communities to prescribe the service and the public's correlated duty to see that the cost of service is paid from fares or from public contributions.

Present Situation Encourages Optimism

Without public recognition of these fundamentals it will, in my opinion, be impossible to restore electric railway credit. I do not believe that the investor can be induced to loan his money upon any such basis of relations as that which now exists. I do not believe that he can be persuaded to assume all of the risks if he be denied the chance of profits properly coincident to such risks. The future of the electric railways as a privately owned and privately operated industry is in his hands and it is his requirements that must be met. It will little avail the public seeking his capital to evolve plans for the settlement of the problems which do not meet the investor's demands. Their approval by social reformers, professional and political "friends of the people" and experts of whatever kind and whatever inclination will not suffice. For the man with capital, and that applies to the workingman and rich man, wants either safety and assurance of return or he wants a speculative chance to reap a big reward. And because the electric railway utility cannot offer him speculative advantage it must offer him safety and assurance.

The Proper Requirements for Correct Industrial Illumination

The Bugbear in Good Lighting is "glare"—Its Importance is Understood When We Consider That Daylight, Possibly 1,000 Foot-Candles Illumination, Causes Our Eyes No Distress Because Properly Diffused, While a 16 c.p. Lamp Frequently Has a Blinding Effect Because Improperly Installed.

Correct lighting practice is founded upon tangible and profitable results. Did not money and other benefits flow from good industrial lighting, it would not have risen to an exact science, or its practice to the dignity of an engineering profession.

To-day, the requirements are known. There is no longer any guesswork, for, illuminating engineering practice gives definite detailed rules for the proper installation of correct lighting equipment.

A modern factory lighting system must be designed to conform to these requirements:

1—Absence of glare.
2—Sufficient intensity.
3—Proper direction of light rays.
4—Good diffusion.
5—Steadiness of light source.
6—Proper intensity on walls and ceilings.
7—Simplicity, reliability and economy.

Avoid Glare

Glare has been described as light out of place. It can and does do more harm than any other part of a poorly designed lighting system.

Glare causes eye strain, which in turn results in headaches, indisposition to work, spoiled material, decreased production, many accidents.

The safety of the eye is as important as the safety of limb. Impairment of vision is a slow process, and it may take months or even years before the individual becomes aware of it. However, during the time the impairment is taking place the individual is suffering discomfort and his efficiency is decreasing.

The Eyes

The eyes are the most delicate organs of the human body and must be protected to give continued and efficient service. The camera embodies the same mechanical principles as the eye. That is, it is equipped with a lens, diaphragm, sensitive surface and focusing mechanism. In the eye the size of the pupil regulates the amount of light which enters. Under the influence of glare, the pupil contracts over much, which results in decreased ability to see, with various detrimental results. Under proper lighting conditions the pupil expands normally, and thus allows greater distinctness of vision.

What Is Sufficient Intensity?

Different industries and different operations of a given industry require varying intensities of illumination. Since the light which is really effective for purpose of vision is that which enters the eye from the object viewed, it is necessary to make the lighting system supply enough light to the object, so that the amount reflected from it to the eye will be sufficient for clear and comfortable vision.

In other words, the "brightness" of the object is the vital factor, and this depends not only on the light received, but upon the reflecting power of the illuminated object. Materials vary quite widely in reflecting power. White surfaces reflect as high as 80 per cent. of the incident light, but black objects only a fraction of one per cent. Thus light objects have high reflecting power and dark objects low reflecting power.

When designing a lighting system for a given shop, careful attention must be paid to the average reflecting power of tools and materials. In a textile mill where only white goods are made, a certain intensity of illumination may be satisfactory, but if the goods are red, brown or some other dark shade, a higher intensity will be necessary. For rough work, requiring no observance of fine detail, a moderate intensity is adequate; whereas, for fine work such as weaving, the illumination must be strong enough to enable the operator to handle with ease the individual threads. In fine machine work, in which accurate measurements are made and tools must be set with great precision, a very intense illumination is required.

The trend of intensities is upward. The table herewith gives the correct intensity of illumination necessary to properly perform the work required in various industries.

Direction of Light

One of the fundamental principles of good illumination is the installation of a number of smaller light sources in preference to a few large ones. This insures better distribution, eliminates sharp shadows and protects the operator against the handicap of working in his own shadow. Then no matter where machines or benches are located, the light comes from the proper direction, when the proper lamp is used, in sufficient volume to provide adequate illumination for the particular work in hand.

This is one of the reasons why wise industrial management will require the services of a competent architect, engineer or lighting specialist in connection with laying out the wiring and locating the outlets for any system of illlumination.

Diffusion Is Essential

Diffusion is one of the big reasons why daylight ordinarily is superior to any substitute for lighting all round work. Diffusion eliminates sharp shadows and the objectionable glare of the direct and redirected light rays. In artificial lighting it is produced by obstructing and breaking up the direct rays of light by means of some opaque or translucent material, by using large reflecting surfaces or by installing units so that light rays from many sources fall upon the work.

Diffusion relaxes the strain on the muscles in the eye, allows more light to enter, and improves the ability of the eye to see.

Flickering light must be avoided, as it produces the same detrimental results as glare, due to strain of the muscles of the eye through overwork in the attempt to maintain a focus. Steadiness in the light source is therefore an important factor in correct factory lighting. One great invention leading to improvement in steadiness has been the development of the Mazda C lamps. In the matter of steadiness of light flow, this incandescent electric lamp is a rather remarkable advance over those other and older sources of illumination, which are being displayed wherever correct lighting is regarded with consideration.

Moderate intensity on walls and ceilings results in a more cheerful shop, which in turn means more cheerful workmen, who always do more and better work than those who are depressed by somber surroundings. General or modified general lighting gives this result better than any other type of installation.

When all the foregoing technical requirements have been taken into consideration, there yet remain those precautions which insure a system at once simple, reliable, easy to maintain and of low operating cost. This is a matter which is decided chiefly by the physical makeups of the reflectors chosen.

The six technical requirements are those usually considered as the essentials of a good lighting installation. Into the seventh requirement, as outlined just above, there enter considerations other than protection for the eye.

LIGHT INTENSITY REQUIRED UNDER DIFFERENT CONDITIONS

Industry	Foot Candle Intensity
Armory	3.0
Automobile Garage	3.0
Automobile Manufacturing. (See wood working, paint and machine shops.)	
Bakeries	4.0
Bath, Public	
Dressing Rooms	2.0
Swimming pools	3.0
Billboards	8.0
Book Making	
Embossing	7.0
Cutting, punching	5.0
Assembling, backing, pasting, ruling	4.0
Bowling	
Alley	2.0
Pins	5.0
Runway	2.0
Box Making	3.0
Candy Making	4.0
Canning and Preserving	4.0
Carpenter Shops	4.0
Clothing, Cloaks, Suits, Etc.	
Inspection, machine sewing	10.0
Cutting pressing	6.0
Packing	4.0
Cotton Mills	
Inspecting	10.0
Dyeing, weaving	5.0
Spooling, carding, etc.	4.0
Courts	
Handball	8.0
Squash	8.0
Tennis	8.0
Roque	8.0
Depots	
Train shed	2.0
Baggage room	3.0
Die Making	10.0
Drafting rooms	10.0
Electro plating and electrotyping	4.0
Engraving	10.0
Forge shops and welding, drop forgings	4.0
Foundries	
Rough mouldings, charging, cleaning	3.0
Fine moulding, core making	5.0
Glove Manufacturing	
Sorting, stitching	10.0
Cutting, inspection	8.0
Pressing	5.0
Gymnasium	4.0
Laundries and dry cleaning	4.0

Industry	Foot Candle Intensity
Leather Manufacturing and Working	
Cleaning, tanning, stretching	4.0
Cutting, fleshing	5.0
Finishing, scarfing	7.0
Locker, toilet and wash rooms	3.0
Machine Shops	
Die making, fine bench work	10.0
Fine lathe work, inspecting	8.0
Buffers, drills, grinders, shapers, planers, ordinary lathe work	6.0
Saws	4.0
Meat packing	4.0
Packing and Shipping	3.0
Paint Shops	
Automobile, cabinet, furniture, painting and varnishing	6.0
Doors, windows, metal, sign painting	4.0
Paper Box Manufacturing	4.0
Paper Manufacturing	
Beaters	3.0
Calendering	5.0
Finishing, cutting, trimming	6.0
Pattern Shops	5.0
Printing	
Linotype	10.0
Composing stone, type setting	7.0
Inspecting, presses, cutters, perforating, folding	5.0
Sheet Metal Working	
Fine bench work	8.0
Ordinary bench work	4.0
Shoe Manufacturing	
Inspecting, sorting, lasting, stitching, welting	7.0
Hand turning, ordinary machine work	4.0
Soap Manufacturing	
Kettle houses, cutting, ships, powder	3.0
Filling and packing soap powder, stamping, wrapping	4.0
Stock rooms	3.0
Textile Mills	
Cotton	3 to 6
Silk	4 to 8
Woolen	4 to 10
Warehouse	2.0
Wood working (fine)	
Carpentry, pattern making, jointing, cabinet and furniture making	5.0
Wood working (rough)	
Trucks, barrels, boxes	3.0
Wharves	2.0

The Contractor-Dealer

Teaching Dollars to Have More Sense (Cents) —Learn the Difference Between "Electrician" and "Electrical Contractor"—W. J. Shores E. E. Tells N. Y. Contractors' Association About the Value of a Simple Accounting System

We contractor-dealers are not professional men like lawyers, doctors or engineers; we are not artists like actors, painters or writers, nor are we mechanics like carpenters, plumbers or masons. We are business men just like bankers, manufacturers or merchants.

It is my object in this talk to prove that we contractor-dealers, by bearing in mind that we are conducting a business and by using modern business methods, will be able not only to render a greater service to the public and elevate our standing in the business community, but will reap as a return a greater financial reward.

Unfortunately, the majority of business men are apt to regard us as a superior sort of mechanics in business for ourselves. And they are hardly to be blamed since so many contractors hold that same opinion of themselves.

It is a fact that many contractors take a great deal more interest in laying out a special signalling, lighting or power installation than they do in analyzing monthly profit and loss and trading statements. This will not establish a well balanced business. They are more interested in the closing of new contracts than in the analysis of previous contracts of similar character which would show clearly whether this business was profitable or not. This is not sound business either.

It is my belief that nine out of ten contractors can estimate correctly on work and that these estimates will come within 5 per cent. of one another so far as prime costs of labor and material are concerned. Yet where estimates are presented to customers they vary between highest and lowest as much as 75 per cent. What is the effect of this wide diversity upon the customer?

Not Profiteers

It is inevitable that the customer should either feel that we know very little about our business so far as figuring goes, or it will strike him that we are profiteers, for how can one man ask nearly twice as much for work as the other fellow, and still be on the square? It never occurs to him that the low man is perhaps losing money.

Just think for a moment of the effect produced on the customer if all estimates came within 5 per cent. of one another! Don't you believe that after a while it would be less a matter of competition in price and more a matter of competition in quality and service Is it not self evident that such variations in prices must have a bad affect on the standing and reputation of our business?

The electrical contracting business is in its infancy and it has grown so fast that little time has been devoted to an analysis of the conditions under which we work and which directly affect our future welfare and prosperity. We are just beginning to realize that our work is a business and we have it in our own power to train and develop that business to a degree where it will compare favorably with older, better established and more respected industries.

We ourselves may not live to see this realized but I feel that we should have the vision to start in motion those business principles which, though we may not witness their fulfillment, will in their application alone be of inestimable benefit to us.

Figures Are Important

The necessity for facts and figures is becoming of greater importance day after day.

Estimators can figure out very closely indeed just what certain jobs will cost. They know very closely just how much labor will produce in a given time. Their associations have succeeded in the establishment of standards.

Retail merchants through associations and organizations have established standard costs of doing business, covering all kinds of stores in all kinds of communities.

Electrical contractors have not yet succeeded in establishing standards for their own business.

I might ask you several questions, such as:

On what factors should the annual salary of the contractor depend?

What is considered a fair amount of business for a contractor in a town of 20,000, or a city of 150,000?

What amount of capital is required to handle an annual business of $25,000, $50,000 or $100,000

How much money should be spent for advertising?

It is difficult to answer these questions, but I do know that if all contractors kept definite records of business transactions and that if this information were collected and carefully analyzed, then after a few years we would be able to establish definite standards.

An analysis of our business shows that it is divided into four separate branches, all of which are under the supervision of the owner or executive. They are:

1—Selling
2—Installation and Repair
3—Financing
4—Accounting.

A brief explanation of this chart would make the analysis somewhat more clear.

Every business man or contractor-dealer is vitally interested in the progress and development of each of these branches of his business organization.

He wants to see more sales made and more contracts closed. He wants to be certain that his labor and material costs come within his estimates. He wants to be certain that the appliances he sells and installs are paid for promptly in order that he may pay his labor regularly and discount his bills for material used. And, after having done all this, he wants to be certain that at the end of the year he has earned a profit.

All of this may easily be accomplished with the help of an accounting system. The National Association of Electrical Contractors and Dealers has developed such a system which serves the purpose in splendid fashion. Any good bookkeeper can install it and can prepare monthly, quarterly and annual statements.

Four Executive Branches as Applied to Business

EXECUTIVE ACCOUNTING
- Selling
  - 1. Sale of appliances
  - 2. Estimating on contracts
  - 3. Closing of contracts and orders
  - 4. Advertising
- Installation Repair
  - Installation of equipment
    - Delivery of material
    - Supply of labor
    - Superintendence
    - Engineering
  - Repair work
- Financing
  - 1. Disbursements
    - Materials
    - Labor
    - Salaries
    - Expenses
  - 2. Collections
    - Regular accounts
    - Overdue accounts.

You will note that the accompanying chart is divided into two portions:

1.—Monthly business billed and gross profits.

2—Overhead and net profits.

The gross business billed is a direct check on the Sales Department. By means of it we can readily ascertain the increase or decrease in business secured.

The cost of the jobs billed is shown directly by the costs of labor and material. This data is obtained directly from the job envelopes and they show very clearly the exact amount of gross profit on each job; and let me say that the average contractor is no slouch when it comes to installing work efficiently. He takes it so cheaply that he's got to be efficient. This is one case where low price is the mother of efficiency.

The difference between sales billed and net costs is the gross profits.

The second section of this statement shows the monthly overhead.

There are four columns, the first showing actual costs, the second column showing the percentage these costs bear to the gross sales billed. The third column is an average percentage prepared by W. H. Morton, secretary of the National Association of Electrical Contractor-Dealers, from reports sent in by members all over the country. Mr. Morton stated that the reports of members using the standard accounting system were very much clearer and more explicit. The fourth column is an average percentage secured independently by the Society for Electrical Development and has been copied from their July Sales Service.

Under salary and wages is included the salaries of all persons whose expense cannot be charged to any one job. And in here must be included the salary that the boss receives. It is considered good business for the owner to draw a salary regularly. Statistics show that this item varies between nine and eleven per cent.

The next item covers Rent, Light, Heat and Power. This is usually about three per cent. Postage, Telegraph and Telephone is about four per cent. Under Advertising, from one to four per cent. is appropriated.

Unfortunately very few contractors realize what a powerful and influential agent advertising is to the man who wants to develop his business, increase his share of good will, establish his reputation, and maintain a uniform influx of business. My time is limited and I cannot say all I wish regarding advertising, but every contractor ought to establish a fund and advertise. This advertising, whatever its nature, should, when once started be continued for at least two years before its results are measured.

Depreciation is an allowance, usually about five per cent. to cover wear and tear on shop or store equipment.

Under reserve for bad debts an allowance of from five to two per cent. per month of the gross is deducted to take care of failures and losses. The contractor who does not allow for this, usually suffers from such losses. The contractor with sufficient judgment to provide for this, usually exercises care before accepting a contract to make sure that payment is guaranteed. It is a case of 'He who has, gits."

I have heard a great deal of contractors who fail in business, but have never seen the names of any in the list of failures published. As these facts did not correspond, I asked a jobber the reason why. He replied, "They never get sufficient credit to make it worth while."

Gentlemen, if any of us fail, we ought at least get some publicity out of it.

Basis for Credit Rating

At a recent meeting of the National Electric Credit Association, the jobbers stated that the amount of credit extended would be decreased to those members or independent contractors who used no accounting system.

Finally, at the end, there are two other additional sources of income. One covering discounts for prompt payment of bills, the other covering interest in securities such as Liberty Bonds.

The statement just described is the most interesting of all, since it shows clearly the operation of the business. It shows very distinctly whether money is really being made or lost.

In addition to the form shown, there are other statements furnished that are valuable in other respects.

A statement showing the condition of assets and liabilities each month reflects very clearly the form in which the assets of the business are divided. Sometimes the assets are all liabilities.

A statement of accounts payable sometimes stimulates the contractor to an active compaign to collect accounts receivable.

After having such a system of accounting in operation in my business for a period of one year it seems inconceivable to me how a contractor dealer can ever get along without it.

I have set out to prove that we are engaged in a real live and growing business and that by applying business

Profit and Loss and Trading Statement

Contracts completed in March		$7,988.97	100%			
Actual cost labor	$1,311.05					
Merchandise and material	4,144.89					
Direct job expense .	129.45					
Actual cost.. .	$5,585.39	$5,585.39	70.2%			
Gross profit		$2,403.58				
Less discounts allowed .		17.32				
Less allowances		7.54				
Gross profit		$2,378.72	29.8%			
Overhead			I		II	III
Salaries and non-prod. labor .	$ 750.00		9.4		11.0	22.2
Rent, heat, light and power ..	66.66		8		3.5	3.2
Depreciation (equip. and tools)					5	5
Insurance	11.83		1		6	6
Taxes ..	25.00		3		9	7
Interest					6	1.1
Postage, telegraph and 'phone	24.50		3		5	4
Stationery and printing..	12.32		2		3	5
Advertising .	319.56		4.0		9	2.0
Supplies					.	1
Cartage and delivery					9	6
Association membership	10.25		1		1	2
Bad debts	159.78		2.0		7	.5
Gratuities and miscellaneous	16.75		2		4	6
Maintenance					5	.
Overhead	$1,396.65	$1,396.65	16.5		21.9	33.5
Net profit..		$ 982.07	12.2			
Additional Income						
Discount earned	$112.63					
Interest	25.42					
	$138.05	$ 138.05				
Total net profit		$1,120.12	13.3			

principles and acting as business men we can render a better and greater service to the public, achieve a higher standing for our business, and gain a greater financial return.

Any so called faults of the business or public are but reflections of our own actions and characteristics, and it is only by improving ourselves and our methods of doing business that we can expect improvement.

Do you realize that at one time the bankers were despised as a class? But through the application of business principles they have raised the standing of their business to the highest rank.

Do you remember the cigar maker who made his own cigars and sold them in the front of the shop? To-day he is gone and in place we have large numbers of retail stores, well located for the convenience of the public and doing many times the volume of business. The application of business principles accomplished this change.

It is high time that merchandising of electrical goods should be lifted out of the position of being mere side-lines for hardware, drug and jewelry stores.—M. K. Pike.

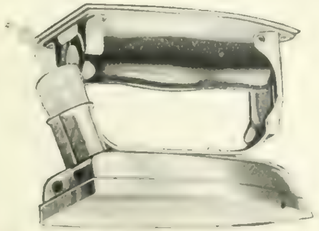
I have shown that you have all the problems encountered by the business man. I have shown that an accounting system if installed and used will serve as a chart to assist in piloting the business through the dangerous channels of business crises and depressions.

Any one can run a business when times are good and prices go up. And it is in these periods that careless and slipshod methods are developed which in times of stress cause business disaster.

An electrician is one who does electrical work. but an electrical contractor-dealer is a business man who hires salesmen to sell appliances and electricians to install them.

Mr. Leacock Arrives Back Safely

Mr. Geo. D. Leacock, sales manager of the Moloney Electric Company of Canada, arrived home Saturday after a three months' trip through the West. While in Winnipeg Mr. Leacock appointed Mr. Frank H. Girdlestone as western district manager of his company. Mr. Girdlestone will take charge of the Manitoba territory. Mr. Leacock also made arrangements to put in a larger stock of transformers in Calgary, his company being represented there by the General Supplies Limited. Mr. Leacock reported electrical conditions in the West as being very favorable, although regretting that some of the greens on the golf courses in Calgary and Vancouver have been slightly worn down since his last visit. Mr. Leacock attended the N. E. L. A. Convention at Pasadena, California.



A "Utility" Iron -Edison Electrical Appliance Co.

Are Any of These Problems Yours?

By T. Berkeley-Irwin

This is just a short pointed discussion on some of the problems which confront the contractor dealer at the present time, especially the man who has but recently started in business for himself and is not blessed with a big capital.

It is a well known fact that the small contractor who also runs a store is handicapped by competition from the men who have no store, but who work from the home, having, in consequence, no overhead expenses to speak of. Such men are able to bring their prices down so low that it becomes next to impossible to compete with them. These same men are usually ambitious to some day possess a store and control a big business, but if they cut prices so low in the future as they have this past year or so, they will be a long time getting to such a position. They not only make it hard for those who already have stores but are creating obstacles to their own future advancement.

Prices Fluctuate

One thing the small contractor needs to remember when giving a price for a job is that what can be done for sixty dollars this week may come nowhere near covering the cost in two weeks time. Prices of electrical supplies, fittings, etc, fluctuate so much that an elevator is not in it when it comes to going up and down. The trouble is that costs are going up most of the time.

I was talking to one of these contractors recently and he told me that he had figured on a job last April giving a price of $152. He received the contract and commenced the work in June. The job cost him $225 which meant a loss of $73 plus his profit. He will have to wire several six roomed houses to make up that loss. If he had been fully cognizant of trade conditions, and had not been so keen to undercut his competitors, he would, when estimating, have allowed a fair margin for overhead expenses, of say twenty or thirty per cent. plus a fair profit. This would have enabled him to at least have come out on the right side.

It is rather amusing to see the would be contractor enter a wholesale house, pick up a coil of wire, some cord, a hundred knobs, tubes and a few other odds and ends, then jump on his wheel and ride away to wire a six roomed house, which when finished will net him about five dollars. This he takes with a smile and goes home thinking he has done a good day's work.

Fair Competition Good for Business

Now I don't want the house contractors to think that the dealers are anxious to force them out of business. On the contrary they realize that competition is good for business, but undercutting is not competition. A few suggestions on figuring out a job may not be out of place. First figure the time with a fair margin, add the cost of material plus overhead expenses—when carrying on business from the home, house rent should be considered as overhead—and a fair percentage for profit, then if prices take a jump or unforeseen obstacles delay the job he would at least stand a chance of coming out even. Another point is the collecting of bills. Give the builder or person from whom the contract was received, a certain length of time to pay then collect if it means a forced collection. The electrical contractor needs his money just as much as the builder.

If in time the house contractor decides to open up a store he would be well advised to go slowly taking each step with due consideration. The most important point is location. Naturally he will be keen to stay somewhere in the same neighborhood, having already become well known as a contractor. This does not mean, however, that he can afford to open up in the first vacant store that offers. Many a dealer has learnt by bitter experience that a store which would have been suitable for drygoods or grocery is of no use for the contractor dealer. Choose a store near a corner—on the corner if possible. The nearer to a theatre or public hall the better. A car stop or terminus is an excellent location. Having chosen the store the next step is to visit the various wholesale houses and make arrangements for an account and credit. Advertise well in the neighborhood the date of opening and the class of goods it is intended to stock. Bank a little money if possible as a reserve, but above all do not spend all income in improvements but be prepared to meet bills as they become due. Do not let travellers load the business with goods but if "No" is said, stick to it. Buy direct wherever possible, this means greater satisfaction. Do not cut prices, it makes enemies among the other dealers. If they are going ahead it means that they are pushing their business and working hard; it is up to the new dealer to push also

When Discouraged Work Harder

Sometimes business goes slow and the dealer is tempted to give up. It is worth while remembering that many of his successful competitors have been through the same experience, but by buckling down to harder work and above all going after business, not waiting for business to come to them, they eventually won success. There are very few business men who have not at some time or other seen hard times and had they succumbed to their discouraged feelings would have ended their business careers as failures.

Keep a neat store and an attractive window display. The latter is worth fifty per cent. of the business. Don't let dust accumulate. Keep up the stock, for every time a customer cannot be supplied it means money out of pocket besides being poor advertisement for the business. It is well to keep a note book handy and as stock begins to get low enter it in this book so that when the traveller calls time is saved and nothing is overlooked.

One final suggestion is to keep prices the same as other dealers. To make this possible without much trouble some form of Business Guide is invaluable. I have used one for some time and find it quite satisfactory.

The contractor dealer is in a unique position. He does not get business by sitting down and waiting for it. He must go after it and allow no opportunity to pass by to make himself and his business well known.

Standard Electric Co. Expanding

A comparatively new store is that of the Standard Electric Co., of 668 Bloor St. W., Toronto. It was opened in the spring by Messrs. A. Bennett and T. Elmer. Mr. Bennett served in France for twenty months with the 20th Batt'n., C.E.F. After receiving his discharge from the army he went into the electric contracting business in partnership with Mr. Elmer. The contracting still forms a greater part of their business at the present time. Both of the partners are far-seeing men as is evidenced by their adding a retail store to their business. Moreover their plans for future development speak well for the continued success of their business efforts.

Have You a Slogan for Your Store?

The thirty-nine electrical slogans that appear below have been compiled for your particular benefit, says "Electrical Contractor Dealer," the organ of the contractors in the United States.

One of these slogans is looking for you as a lost child looks for its mother. Don't allow the slogan to wander out of sight. It is pining to be adopted as the mouthpiece of your store.

"At the Turn of the Switch"—Lynn Gas and Electric Co., Lynn, Mass.

"At the Sign of the Green Candle"—Rusterholtz, Erie, Pa.

"Electrical Conveniences and Refinements"—Walsh, New York, N. Y.

"The Largest Electrical Store for Miles Around"—Electrical Maintenance Co., Youngstown, Ohio.

"Everything Electrical"—Electric Shop, Bellingham, Wash.

"Headquarters for Everything Electrical"—Valley Electrical Supply Co., Fresno, Cal.

"Buy Your Electrical Goods at an Electrical Store"—Electric Co., Jamestown, N. Y.

"The Home of Modern Electrical Household Appliances"—Louis Kalischer, Inc., Brooklyn, N. Y.

"The Place to Buy Electric Labor Saving Appliances"—Public Service, Newark, N. J.

"If It's Electrical We Have It. If It's Electrical We Do It"—Turberville & Harding, Washington, D. C.

"Charleston's Brightest Spot"—Rubin Electric Co., Charleston, S. C.

"The Store Beautiful"—Edison Construction and Supply Dept., Erie, Pa.

"Yours for Service"—Electric Co., Faribault, Minn.

"Intelligent Electrical Service"—Hobreckts, Sacramento.

"Service First"—Edison Electric Co., Duluth, Minn.

"Electrically at Your Service. A Live Wire"—Northedge, Chico, Cal.

"Mac the Motor Man. 24 Hour Electrical Service"—McIntyres, Spokane, Wash.

"We Sweep the State"—Jamouneau Vacuum Cleaner Co., Newark, N. J.

"Bullock's for Washers"—Bullock Co., Oakland, Cal.

"Laundry Appliances for Character"—Good Housekeeping Shop, Dayton, Ohio.

"Domestic Efficiency Experts"—Brown & Pierce Co., Inc.

"Cook by Wire Instead of Fire"—Washington Water Power Co., Spokane, Wash.

"Give the Wife a Square Deal"—City Electric and Appliance Co., Bay City, Mich.

"Telephone 2700 for Our Representative"—Southern Public Utilities Co., Charleston, N. C.

"Complete Electrical Service for the Motorist"—Starter and Ignition Service Co., Rochester, N. Y.

"Electrical Merchants"—Bettmans, New York, N. Y.

"The Electric Shop"—Beattie-McIntyre, Ltd., Toronto, Canada.

"The Electric Servant Store"—Saginaw, Mich.

"The Lighthouse"—Dickman & Gleason, Tacoma, Wash.

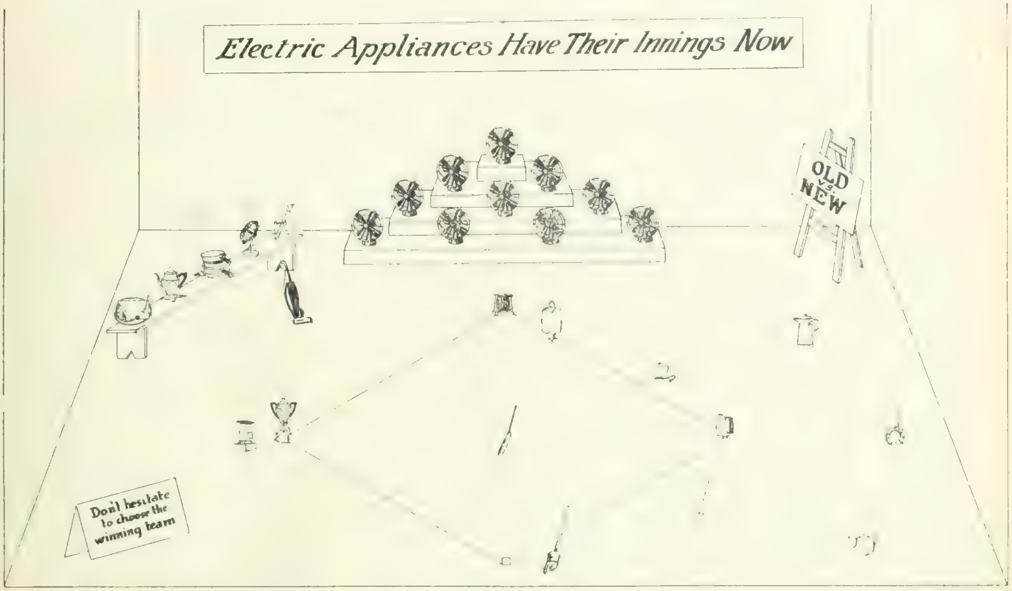
"If Your Trouble Is Electrical, We Can Fix It"—Vaile Battery Co., Fort Smith, Ark.

(Concluded on p. 54)

Electrical Appliances "Blank" the Has-Beens

Try This Out in Your Window When the Baseball Season is at its Height in Your Locality

The suggested window display of the accompanying sketch is intended for a large deep window. With a little local color, such as cards bearing the names and slogans of the local baseball teams, the window could be made very attractive. The window floor should be covered with green cheese cloth or tissue paper, and a baseball outfit placed beside the various players. Added effect could be obtained by placing a large score board on each side of the window in such a position that they would attract the eye of anyone approaching the window from either side. If a referee is required, give the position to the housewife, for she is the best judge


Electric Appliances Have Their Innings Now
OLD vs NEW
Don't hesitate to choose the winning team

Some Points on Selling to Women—They are Good Buyers but Require Sound Argument

"Women are not easy to sell to" was the statement made recently by a successful sales manager. There is nothing new in that, but then there is nothing new under the sun. "The fact is," he continued, "to sell to a woman it is necessary to have a good argument. They all want to buy, and they love to buy, and as a rule the only thing which holds them back from buying is money—always providing the salesman knows his business and can convince them on all points they are doubtful about."

Another sales manager who is handling a large crew of house to house canvassers contends that "Any young fellow intending to become a canvasser, who thinks that, because he will be dealing with women most of the time, he will have an easy job has a great deal to learn. Women are good buyers, but they are as a rule careful buyers. Moreover, they are inclined sometimes to judge by intuition, to the extent of refusing to consider an article if the personality of the salesman does not appeal to them. For this reason it is necessary to have salesmen of good bearing, courteous manners and with a thorough knowledge of the merchandise he will handle."

Other words of advice gained from men with years of experience are:

If a prospective customer should drop something never let her pick it up herself.

Be sure and get the customer's name and use it frequently when discussing the sale; it goes a long way towards making a sale.

While never losing sight of the object of business, do not refuse to discuss other subjects if the prospect brings them up.

Cultivate Pep and Perseverance.

J. H. Edmunds Co., Ltd.

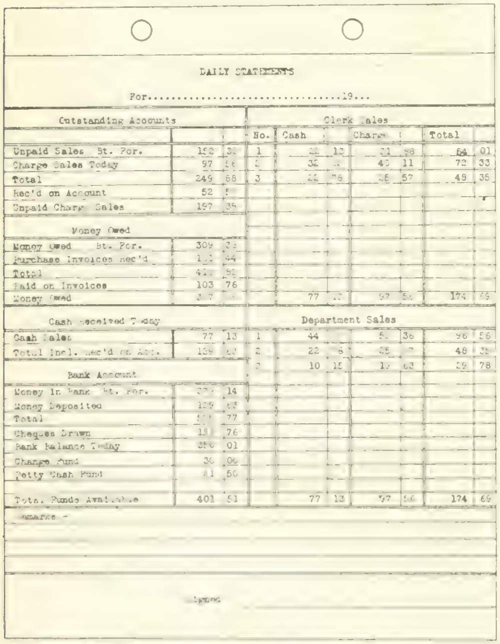
The old firm of J. H. Edmunds & Co., electrical fixture manufacturers and metal spinners, 221-227 Richmond Street West, Toronto, has recently been incorporated under the name of J. H. Edmunds Co. Limited. Mr. J. A. Wilson is the president and general manager, Mr. W. J. Seeviour the secretary-treasurer, and Mr. W. J. Swanton, factory superintendent. Considerable new machinery will be installed and the staff largely augmented in the near future.

Use Daily Statements and Keep in Touch with Your Financial Position

Most dealers will admit the importance of being able to obtain certain figure information at a moment's notice. Especially so in regard to the financial end of a business. Many dealers, however, have adopted no plan to meet this end. Indeed many of them allow their books to get so far behind that they consequently find themselves with a big task at the month end. This does not refer, of course, to the dealer who can afford to employ a bookkeeper, although even he finds that he cannot always get, without delay, the information required.

There is certain information which a dealer should never be without; for instance he ought never to be without a statement of his bank balance. It is not good business to be constantly receiving notices from the bank stating that the account is overdrawn. True, if he is well known at the bank, he can enquire for a statement of his bank balance over the phone, but it is not a good principle to adopt. A simple system of "Daily Statements" such as is described in this article can without much expense or trouble be used to provide, at a moment's notice, any financial information likely to be needed in a hurry.

Fig. 1 shows a card suitable for use in employing several clerks, and selling on the instalment plan. The dealer is thus able to find out a man's value as a salesman, and whether he is earning his pay. In larger stores the business is divided up into departments such as the fixture department, and so forth, in which case the dealer can check up the work of each department and the experts in charge of them.



DAILY STATEMENTS

For..................................19...

Outstanding Accounts		
Unpaid Sales Bt. For.	152	30
Charge Sales Today	97	38
Total	249	68
Rec'd on Account	52	[illegible]
Unpaid Charge Sales	197	35
Money Owed		
Money Owed Bt. For.	309	[illegible]
Purchase Invoices Rec'd	[illegible]	44
Total	41[illegible]	[illegible]
Paid on Invoices	103	76
Money Owed	[illegible]	[illegible]
Cash Received Today		
Cash Sales	77	13
Total Incl. Rec'd on Acc.	129	63
Bank Account		
Money in Bank Bt. For.	[illegible]	14
Money Deposited	129	63
Total	[illegible]	77
Cheques Drawn	1[illegible]	76
Bank Balance Today	350	01
Change Fund	30	00
Petty Cash Fund	[illegible]	50
Total Funds Available	401	51

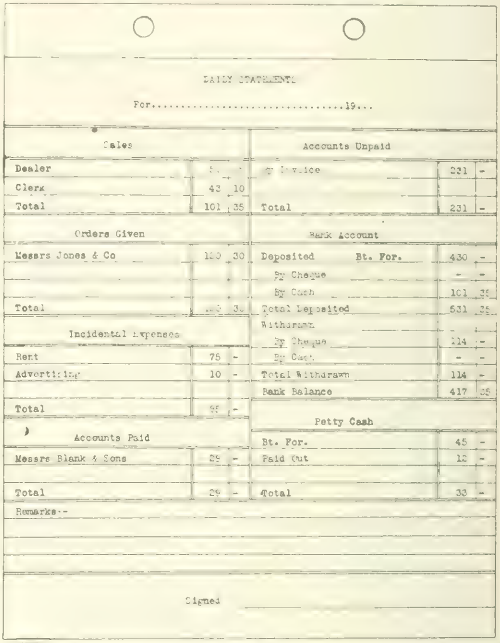
Clerk Sales						
No.	Cash		Charge		Total	
1	32	13	31	88	64	01
2	32	[illegible]	40	11	72	33
3	22	78	26	57	49	35
	77	13	97	56	174	69
Department Sales						
1	44		5[illegible]	36	96	56
2	22	6	26	[illegible]	48	[illegible]
3	10	15	1[illegible]	63	29	78
	77	13	97	56	174	69

Remarks -

Signed

Fig. 1

Fig. 2 shows a card suitable for the small dealer who cannot afford to sell on the time payment basis, and has to keep his own books. It is much more simple, but will give just as valuable information.



DAILY STATEMENTS

For..................................19...

Sales		
Dealer	5[illegible]	[illegible]
Clerk	43	10
Total	101	35
Orders Given		
Messers Jones & Co	120	30
Total	120	30
Incidental Expenses		
Rent	75	-
Advertising	10	-
Total	85	-
Accounts Paid		
Messrs Blank & Sons	29	-
Total	29	-

Accounts Unpaid		
By Invoice	231	-
Total	231	-
Bank Account		
Deposited Bt. For.	430	-
By Cheque	-	-
By Cash	101	35
Total Deposited	531	35
Withdrawn		
By Cheque	114	-
By Cash	-	-
Total Withdrawn	114	-
Bank Balance	417	35
Petty Cash		
Bt. For.	45	-
Paid Out	12	-
Total	33	-

Remarks.--

Signed

Fig. 2

The space reserved for remarks is the same in both cases. In it should be stated such information as: Styles of window display, advertising done and anything likely to be of value later on.

By a constant reference to the cards and a comparison from time to time such a simple scheme will be found to be of incalculable value. If kept up to date, it should not take more than twenty minutes to fill in Fig. 1 and in the case of Fig. 2 ten minutes ought to suffice. A special file should be provided in which to keep them so that they will be easy of access at any time.

Economy Fuse & Mfg. Co.

The Economy Fuse & Mfg. Co. of Chicago, manufacturers of Economy renewable fuses, announce the appointment of Mr. F. L. Easton as district sales-manager of their Denver office, 205 Commonwealth Bldg., Denver, Colorada, succeeding Mr. R. M. Olsen, who resigned recently. Mr. Easton formerly was connected with the Economy Fuse & Mfg. Co. but more recently has been doing sales promotion work for the Gates Rubber Company.

Garner's Store Nicely Planned and Well Located

Mr. A. Garner, electrical contractor dealer of 476 Bloor St. W., Toronto, has been in business at his present store for six years. He has named it the Bloor Electrical Store. Mr. Garner has the advantage of a good site, a roomy store and a good display window.

The store has a frontage of 13 ft. and a depth of 36 ft. The window is 9 ft. wide by 5 ft. deep. Other measurements are:

Large showcase 11 ft. x 2 ft.

Small showcase 4 ft.- high x 3 ft. 6 in. wide x 9 in. deep.

Centre table 10 ft. x 3 ft.

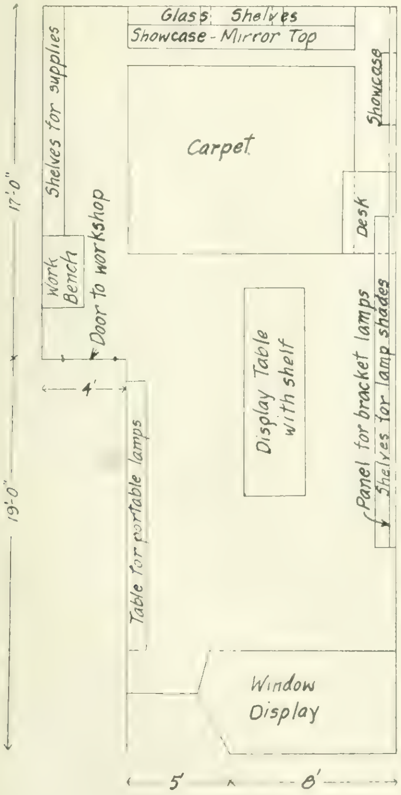


Table on left of door 13 ft. x 2 ft.

Shelving on right 16 ft. x 12 ft.

Shelving on left 11 ft. x 12 ft.

The large showcase has a mirror top and another mirror rises from the case to a height of 3 ft.

The floor is covered with linoleum, with a square of carpet in front of the silent salesman. Four chairs are placed about the store for the convenience of customers. The workshop is in the basement.

Mr. Garner claims that, as he is selling lighting fixtures, the best advertising he can give to the public is plenty of good lighting in his own store. Consequently his store is always a blaze of light.

When You Know a Fellow

By Edgar A. Guest

When you get to know a fellow, know his joys and know his cars,
When you've come to understand him and the burden that he bears,
When you've learned the fight he's making and the troubles in his way,
Then you find that he is different than you thought him yesterday.
You find his faults are trivial and there's not so much to blame
In the brother that you jeered at when you only knew his name.

You are quick to see the blemish in the distant neighbor's style,
You can point to all his errors and may sneer at him the while,
And you prejudices fatten and your hates more violent grow
As you talk about the failures of the man you do not know.
But when drawn a little closer, and your hands and shoulders touch,
You find the traits you hated really don't amount to much.

When you get to know a fellow, know his every mood and whim,
You begin to find the texture of the splendid side of him;
You begin to understand him, and you cease to scoff and sneer,
For with understandings always prejudices disappear.
You begin to find his virtues and his faults you cease to tell,
For you seldom hate a fellow when you know him very well.

When next you start in sneering and your phrases turn to blame,
Know more of him you censure than his business and his name;
For it's likely that acquaintance would your prejudice dispel
And you'd really come to like him if you knew him very well.
When you get to know a fellow and you understand his ways,
Then his faults won't really matter, for you'll find a lot to praise.

Hubbell "Standard" Plugs

The Harvey Hubbell Company, Canada, have issued a folder describing Hubbell "Standard" plugs and receptacles. These plugs and receptacles are the well-known interchangeable line. The folder is illustrated to indicate the operation of the equipment.

L. C. Barbeau and Company, 320 St. James St., Montreal, have recently reorganized and will be known as the L. C. Barbeau Company, Limited. Their business in future will be strictly wholesale, and not wholesale and retail as in the past.

Ho! A Salesman's Life Is the Life for Me

"There are plenty of folks who think a salesman's life is tedious and monotonous," said Bert Fraser, a retail salesman of many years' experience, and when I see the way some of the salesman act I don't wonder that those who have never served behind the counter gain such an impression. I admit there are times when it becomes a little boring, but experience has taught me that it is up to the fellow himself—partly at any rate—to create his own interest and excitement. The salesman is yet to be found who, thoroughly interested in his job, has not taken some pleasure as well as profit, from his work. There was Jimmy Wallace, Billy Findlay and numerous others I could mention, all princes in the retail selling line, who asked nothing better than to serve the public. Counter jumpers we may be called sometimes with a sneer, but believe me it takes intelligence to be a good counter jumper. But there! I didn't start out to eulogize salesmanship, but to emphasize the point that our job is not without its interests and pleasures. The fact is this very day I completed a sale, the story of which is almost a romance.

It all began two years ago, when for some time I had been giving thought to methods of increasing my sales and, incidentally, my salary. My notebook was showing the results of this effort, as well as of some hard work in connection with it. It included a list of people in the neighborhood who were without electric appliances of any kind and who, for various reasons, really needed them. To be sure everyone ought to have them, but there are some who need them more than others. These include the class who either cannot or will not afford a servant. To take advantage of this list it was necessary for me to spend at least four evenings each week telephoning and calling upon the prospects. If nothing came from it the time was my own and no one would be the worse off, not even myself, for the very least I could get out of it would be valuable information that would come in handy at some future time.

The results were surprisingly good, though; but my story is chiefly concerned with one family of the same name as myself—Fraser. Mrs. Fraser is Scotch and so am I, and we both attended the same church, so that it was easier for me to get an introduction to her. One evening I telephoned to her house and boldly asked for an interview, explaining that is was a matter of business. She consented and the next evening found me at her home. As you know, a little bit of diplomacy goes a long way sometimes, and that was the method I adopted to commence with, starting off with "Mrs. Fraser you are Scotch and so am I, your name is Fraser and so is mine. It seems to me then that we have two perfectly good and sufficient reasons for our being perfectly candid with each other." Well, this appealed to her and from that time on there was no difficulty in retaining her attention to the business which had taken me there, namely, to try and induce her to buy an electric washer. She heard from me all the usual commonplace arguments for the benefits she would get out of possessing one, such as: it would relieve her of hours of hard work; that after years of slaving with the old method it was due to herself to ease up in every way possible; the saving in time; the insignificance of running expenses; the fact that the clothes would be washed clean, and at the same time (because not handled so roughly by the machine), would not wear out so quickly, and so on. She listened very attentively, here and there interjecting a pertinent question and throughout showing an intelligent interest in what I had to say. She admitted that it sounded good and that she would very much like to possess one, but felt she could not afford it. Then she explained to me that she had no home of her own but was keeping house for her son, and felt that she ought not to spend his money in such a way. It was easy enough to get her to talk of her boy and I found that since she had been a widow he had been very, very good to her and she was proud of him. It was also easy to gather that he was very thoughtful of her comfort and if she had not up to that time possessed electric labor-saving devices it was because he had not had their value pointed out to him. My next move, then, was to get hold of him and so, thanking her for her kindness in sparing me the time to talk shop, I left with the full intention of having an interview with the son.

It was a week later before the opportunity occurred, but when it did I made the best use of it. He was given the same reasons as his mother for their need of a washer, but with special emphasis on the fact that his mother had been many years working for his comfort and that it was up to him to show that he fully appreciated what she had done by installing, at least, a washer in the house for her benefit. He was impressed with the logic of this and consented to visit the store and look over a machine and go thoroughly into its good points. True to his word he came to the store and was more than ever impressed, but he was a real Scot, and would make no hurried decision. Next he was persuaded to take a trip with me one wash day to the home of one of our customers who was enthusiastic about the machine. I think he asked her every question it was possible to ask about the washer, but she answered him readily enough and what was more pleasing to me seemed to be glad to do so. When we left her house I had pretty nearly got him where I wanted him, but gave him the name of several other owners of the washing machine we sold, so that he would not think that I had merely taken him to the one most pleased with the washer. Some of these he visited and when next I saw him his mind was almost made up in favor of a purchase. I finally suggested that we would put a machine in his house for two weeks on trial, and if he felt that it was not all that had been said of it, we would take it back and nothing more would be said about it. To this he agreed and between us we decided that it would be a good idea to have it sent round while the old lady was away and thus give her a pleasant surprise. This plan was carried out and it was a howling success. I wasn't there when she first saw the machine, but two weeks later called to see if she was satisfied with it or wished to have it returned to the store. You couldn't have pried that washer from her laundry with the biggest crowbar that was ever made and I left her home feeling that I was a fit subject for sainthood.

From time to time since, Mr. Fraser has bought other appliances for his mother until now she has about everything that she can use. Then, too, we know of about thirty customers we have got as the direct result of both mother and son speaking to their friends enthusiastically about their appliances, and goodness alone knows how much indirect advertising has been the result of that one sale.

That is not all either, for now comes the climax of the whole matter, and which led me to tell you the story. A month ago we wired a new house for Mr. Fraser, installing fixtures and wall outlets all over the house and to-day we delivered a complete set of appliances not even excepting an ironer. He is to be married to-morrow and with those appliances went a little present and my heartiest wishes for a very happy marriage.

VACUUM CLEANER FINDS LIFE INTERESTING

Helped in Church Cleaning—Mistress Great Advertiser

You ask me if I have an unusual story to tell about events which have happened during my life time. Well, I don't know that you would call them unusual, but I don't mind spinning a yarn and you can judge for yourself as to its interest.

Delivered to a dealer, from the factory where I was made, I was kept there for a week or two and during most of the time used for demonstration purposes. During one week I was placed in a window and displayed to the public. Many people saw me and I heard many comments, but the majority of people said: "Why don't they have some one in the window with the cleaner to show us how it works, like Mr. Brown does?" Well, my owner did not seem to think of that, but he was not lacking in keenness to make a success of his business. The fact was he was new to the business of selling appliances. However, someone must have given him a hint for he took me out of the window and sent me from the store with a young fellow named Tom, to call at the homes of the people most likely to buy a vacuum cleaner.

Sometimes we were received with a rebuft as in the case of one lady, who, in reply to Tom's civil question as to whether she would care to see the machine working, said: "Be off with you, I don't want to buy anything, I can't make ends meet as it is." Tom said he was very sorry she was finding it so hard, but hoped that things would improve for her in the near future. This softened her a little and she told him that there was nothing she would like better than a cleaner, but she couldn't afford one, and that she had been bothered with so many canvassers who would insist upon taking up her time when she had told them it was useless. But that was just like Tom, even if he was insulted he would always retain his courteous demeanor and say as he left. "Well perhaps at some other time my friend here—patting me—and I can be of help to you" and then he would raise his hat and walk away.

As a rule though he was invited inside the house. I always had my suspicion that some ladies considered it a good opportunity to have their carpets cleaned without expense or labor to themselves. Tom didn't worry about things of that nature, all he wanted was to get inside the house, which would give him a chance to talk about the cleaner and show them what it would do. And, my word, he could talk. He would start in by telling all about the value of cleaners in general. First of all he would explain how they saved work by sucking in the dust instead of stirring it up and causing it to float around, settling on furniture and thus necessitating dusting after sweeping. Then he would point out that the cleaner was so easy to manipulate that it could be worked with one hand and thus there was no resulting arm ache as in the case of the old-fashioned broom; neither was there any damage to the carpet because the dust was drawn out of the carpet and not scrubbed out. He also explained that the vacuum, unlike the broom, took up more than surface dirt. He further stated that there were several attachments which could be purchased with me, and which would make it possible to clean places which, without the machine, necessitated climbing steps or moving pieces of heavy furniture. All this Tom called "selling the idea," or service. Then he would start in to tell them why I was the best kind of vacuum cleaner on the market. Between you and me it often caused me to blush to hear the nice things he said about me and in time I began to believe them myself. He used to get some funny excuses from the people when they did not want to buy a machine. Perhaps the most amusing was that of one woman who, in the depth of winter and with several inches of snow on the ground, said that she couldn't afford a cleaner because she had just bought a lawn mower.

Tom kept me with him for a long time, taking orders, but always filling them with one of my brothers, because he said I brought him good luck. However, he had to leave me at last, and since then I have been serving an old lady. Soon after she bought me she took me into a neighbor's house and showed her what good work I could do, with the result that Tom got a sale there. On another occasion, when all the members of the church to which she belonged were asked to help clean the church and vestries, she took me with her and cleaned all the carpets, cushions and corners of the pews where usually the dust gathered. What is that? How was she able to reach all the corners in such a building? Oh, that was easy, she simply rang up Tom and told him what she wanted to do, and asked him if he could not loan her some extra cord and fix it up so that she could use it all over the building. She artfully suggested that he go with her to the cleaning, and perhaps he would get an opportunity to explain the utility of the cleaner to the other members of the working party. Tom jumped at the chance and, indeed, did most of the work. Two weeks later he rang up my mistress and told her that he had already sold some machines as the result of the church work, and had good prospects for several more, thanking her for the opportunity she had given him.

About a week ago an electric percolator arrived at the house and I had a chat with him. I learned that Tom had sent him as a gift to my mistress, because she had been the means of his selling quite a number of vacuum cleaners.

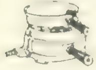
Well, I guess I have talked enough for one day. Come around some other time and I will tell you of other experiences.

It is high time that merchandising of electrical goods should be lifted out of the position of being mere side-lines for hardware, drug and jewelry stores.—M. K. Pike.

Obituary

Mr. James M. Hargreaves, manager of Messrs. Dawson & Co., Winnipeg, dealer in electrical supplies, died at his home in that city on May 4th.

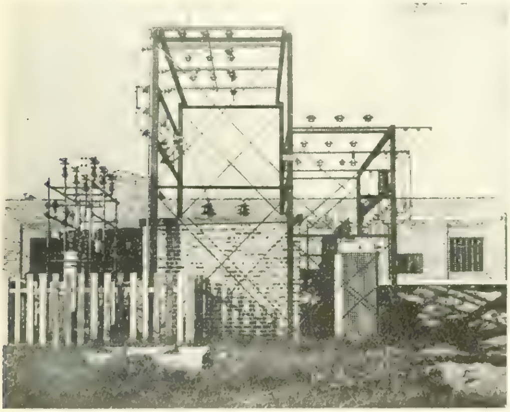
The
Red
Triangle



Supplying Central Station Power to Coal Mines

During the past two years there has been a great increase in the number of coal mines using power supplied by central stations. Some generating stations have been built to supply power exclusively to mines. Others have materially increased their distribution systems in new mining districts. The extensions in connection with the low cost outdoor substations make it possible to economically supply power for both small and large mines.

A transmission voltage of 33000 volts will be found suitable for a large majority of cases. It has the advantage of reasonable line costs and the use of standard substation equipment, which can be quickly assembled from factory stock parts. Where possible it is advisable to use a ring feeder system as the transformers can be energized from either or both ends of the ring. A typical outdoor sub-station arrangement is shown and, in case of line failure, either main line switch can be opened and the substation supplied from the line in operating condition. For small capacities the transformers can be mounted on platforms above ground level. For large stations it is better practice to install the transformers at ground level surrounding them with a suitable fence.



A good example of central station service to coal mines is a Middle West transmission system, serving twenty-one mines from thirteen outdoor 33,000 volt sub-stations with an aggregate capacity of 5375 kw. During one month's run the sum of the kw. demands from the different mines amounted to 2239 kw. and the kw. hours sold were 184,185. The total peak at the power plant was 3000 kw. all carried by one 2500 kw. generator. The aggregate peak of all customers amounted to 4258 kw. showing a favorable diversity factor contributing to the making of attractive rates for this class of business. The average number of mine working days was 20 per month or 240 per year, these values however, varying with the different mines. There is, however, more or less constant power demand. While some mines may be closed as far as mining or hoisting coal, they have to keep the pumps and fans running—also requiring a certain amount of small power load about the mine each day and every hour of the day. In short, coal mines are good consumers from a central station standpoint.

Central stations in many instances have not fully developed the coal mining load realizing that it was often a hard problem to convince the mine operator that power could be purchased at less cost than it could be generated at the mine.

At old mines having their own plant the central station opportunity will come when it is found necessary to expand and enlarge the capacity. This is a good place to put in a motor generator running it in parallel with the coal mine plants. The mine owner will quickly see that with this auxiliary central station power he can shut down his generating plant on days when he is not mining coal. Other savings can be effected by banking fires and laying off all labor during the night shift. In one case a steam hoist was changed over by putting a gear wheel on the sheaves and gearing to a motor.

By starting in this way the old mines can be gradually won over and will eventually take more or all power from the transmission lines. In many cases it can be pointed out that further development is possible than would have been considered if the mine owner had to enlarge or rebuild the steam plant.

Very little trouble should be experienced by the central station in selling power to the new mine as coal operators now realize that isolated plants cost money, depreciation costs run into considerable figures and by securing current through the outdoor sub-station his power problems can be transferred to an organization best equipped to handle them.

In a new district recently opened the transmission company is supplying power to a mine which expects to get out 6500 tons per day. The hoist has a 400 kw. synchronous generator set and a 600 h.p. direct connected d.c. motor on the hoist. All current is sold on a demand basis using the average of highest three 15 minute integrated peaks each month. Other mines are being opened in this district and power will be supplied through outdoor sub-stations.

Montreal Street Lighting Contracts

The Administrative Commission of Montreal has decided to call for tenders for street lighting to cover a period of ten years. As the present yearly cost for illuminating the streets and squares of the city is about $300,000, the new agreement will represent an outlay of about $3,000,000 in that period.

The contract with the Montreal Light, Heat & Power Company costs $260,000 a year, and that with the Public Service Corporation $49,000, making a total of $309,000 a year. The present rate for ordinary arc lights is $63.15, and as there are 3,046 of these lamps, the cost is $192,356. There are some lamps which cost more, for example, the 200 lamps at $90 each, and 66 at $85 each, and there are also 413 lamps which cost the city $72.80 each.

The Administrative Commission in May last authorized an agreement with the Montreal Light, Heat and Power Consolidated for the supply of 4,000 h.p. for the new electrical pumps at the low level pumping station. This has been annulled as the Commission is bound to call for sioners have, therefore, decided to also call for tenders tenders for any amount exceeding $2,500. The Commis- for the supply of power for the pumping station.

Plans have been completed and approved and construction will commence within a few weeks of the new $1,500,000 hotel at Windsor, Ont., to be known as the Prince Edward hotel, in honor of the Prince of Wales. The new hotel, which will be under the management of the United Hotels Company, will be a 10-storey structure and will be located at the corner of Park St. and Ouellette Ave.

Largest Electrical Get-Together Meeting Held in Pittsburgh

More than 600 persons, representing nearly every electrical manufacturer, jobber and contractor-dealer in Pennsylvania, were gathered together in Pittsburgh on June 23. This meeting was part of the two-day conference of the Pennsylvania State Association of Electrical Contractors and Dealers. At this conference the electrical contractor-dealers of this district were reorganized and the Pittsburgh Section of the State and National Association was formally inaugurated. There were four speakers at the dinner, each touching on a particular phase of electrification and the possibilities in the near future. M. C. Turpin, assistant to manager of the Westinghouse Department of Publicity, talked on "Electricity To-day" and showed the wonderful things which electricity has done to make the country what it is to-day. H. B. Kirkland of the American Wiremold Company, presented statistics on why there would be a two billion dollar merchandising business for 1920. Some of the figures which Mr. Kirkland gave were that there will be sold in this year 1,200,000 vacuum cleaners, 1,800,000 electric washing machines, 1,000,000 electric fans, 3,000,000 electric portable lamps, 14,300,000 wiring devices. Colonel L. T. Peck, Argentine Manager of the Westinghouse Company, talked in place of Samuel Adams Chase, who was absent on account of ill health. Col. Peck told about conditions in South America and said that in Buenos Aires 80 per cent. of the houses were wired for electricity. Electrical dealers' show windows, Col. Peck said, were changed every week and the dealers were fully alive to the merchandising possibilities of displaying their goods in the most effective way to the public A talk by Mr W. L. Goodwin created considerable interest because of the definite manner in which he pointed out what could and should be done in the electrical industry. One feature of Mr. Goodwin's talk was his plea for financial support of the public utilities. He said that public utilities could never hope to compete with industrial concerns as regards the return for investment but that the electrical fraternity should purchase these bonds and urge others to purchase them because of the benefit to everyone of public utility expansion. About $700,000,000 a year is needed for public utility expansion if we hope to take care of the ordinary needs for electrification.

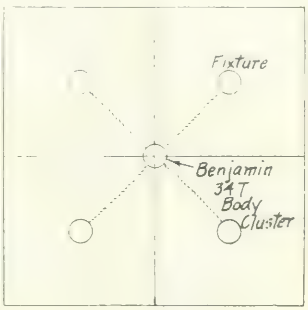
Square D Company Issue New Catalog

The Square D Company of Detroit, Mich., and Walkerville, Canada, have issued their new annual catalog, number 25, showing the following complete line of safety devices manufactured by this company: safety switches, steel enclosed industrial control switches, service entrance switches, motor starters, compensator type switches, plug receptacles, iron clad switches, meter protective trims and a complete list of accessories. An important feature of this catalog is the Square D enclosed cut-out box, a new device designed for use in connection with Square D switches. In addition to cuts, illustrating all Square D products, the catalogue contains several interesting photographic reproductions of safety installations from various parts of the country, while other portions of the catalog give valuable information on electrical installations. The company announce that their pocket size catalog will be ready for distribution the latter part of June.

The Providence Electric Heating Company, Limited, has been acquired by a newly incorporated firm. The name will be retained. Headquarters, Montreal, Que. Capital stock, $500,000.

An Oshawa Dealer Tries a New Method of Displaying Fixtures

To get away from the common method of displaying ceiling fixtures in his store, Mr. Purdy, of Purdy Co , Ltd., Oshawa, Ont., has adopted a new style. The store ceiling is covered with metal sheathing. In the centre of every four plates is attached a Benjamin 34 T. body cluster and from the centre of each plate is hung a fixture. These are connected by short lengths of wire and plugs to the cluster and can thus be taken down at any time without much trouble, or switched around in a few minutes. Another advantage is that it is never necessary to have more than four fixtures illuminated at the same time and any one of these can be disconnected quickly.



The accompanying sketch will give some idea of this simple arrangement.

Electricity on the Farm

The Benjamin Electric Mfg Company some time ago prepared a booklet describing better electric lighting on the farm. This was well illustrated showing a number of typical farm scenes where the work is greatly facilitated by the use of electric light and appliances that accompany it. They have now in course of preparation a revised catalog which will be ready for distribution in the near future. A recent estimate of the number of farms in Canada already supplied with isolated plants places this figure anywhere from 8,000 to 11,000 Considering that this is a matter of 4 or 5 years' growth, the field for farm lighting and other appliances is evidently going to be very large indeed in the near future and should prove an attractive line for the contractor-dealers all over Canada.

Westinghouse Transformer Catalogue

Miniature catalogue 4-A-1, giving a complete list of distribution transformers with list prices, has just been issued by the Westinghouse Electric and Manufacturing Company. Distributed-shell, rectangular-core, and simple-shell construction with auxiliary apparatus has been outlined clearly. Single-phase, 25 and 60 cycle and three-phase 60 cycle transformers oil-insulated and self-cooled, with their voltage ratings have been listed. The standardization of distribution transformers by various associations is discussed.

The Bell Telephone Co. will spend $200,000 this year on improvements at Windsor, Ont.

Stories That Have a "Point" to Them

Don't Knock a Competitor—Service Does Not End with a Receipted Bill

[illegible] stories from electrical salesmen who have been in the game for years.

A canvasser called at a house and tried to sell the lady a vacuum cleaner. During the conservation which resulted he said "Well if you won't buy our machine don't buy a Blank machine." The lady afterwards told someone that when she heard the canvasser make that remark she immediately decided to investigate the Blank machine because she was convinced that it must be a good one, otherwise he would not have feared competition from it and knocked it. And it was a Blank machine that she bought.

Another story which proves that no benefit is gained from knocking the other fellows' goods is that of a salesman who rang up a lady and asked permission to call with a cleaner and give a demonstration. She consented and seemed very interested as he showed her the good points of the machine. Finally she asked him if there were other makes on the market. He admitted that there were and gave her the address and phone number of the most popular machines. Two weeks later she called him on the phone and asked him to call again with a machine; that she had been trying out the others and was anxious to make another test of his machine. He went, and after a demonstration was asked to call a few days later when her husband would be home. He did so and received the order. Her final words were that some of the other machines appeared to be equally good, but that he was the only salesman who had not knocked another machine.

It is well to keep in touch with customers long after they have purchased an appliance. Just a little enquiry over the phone as to how well the machine is working will often result in other sales. One dealer neglecting to do this lost a good customer. The customer in question had some months previously purchased a washing machine, which though it did the work well, began after a month or two to run very noisily. Later the dealer tried to sell her a vacuum cleaner but was tactless enough not to make any reference to the washing machine, and to make promises which he did not try to fulfil when she mentioned that it ran like a traction engine. Consequently when she was ready to buy a cleaner she went to another dealer.

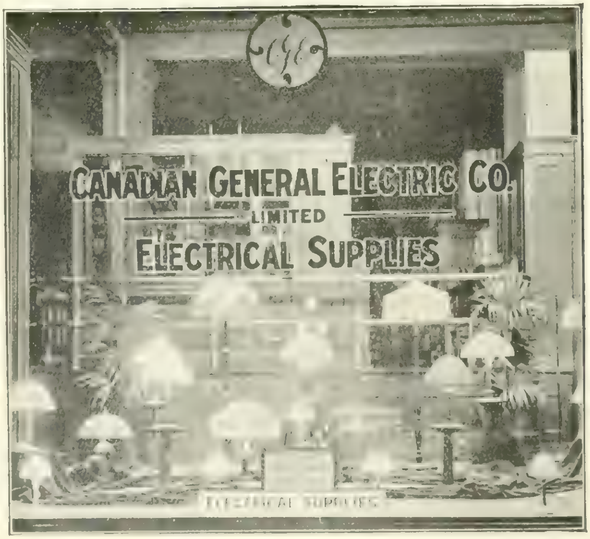
The moral is: A dealer's service does not end when the bill is paid.

It is high time that merchandising of electrical goods should be lifted out of the position of being mere side-lines for hardware, drug and jewelry stores.—M. K. Pike.

Guests of Montreal Tramways

The New England Railway Club visited Montreal June 29th and 30th, and were the guests of the Tramways Company. The visitors inspected the company's lines and plant. In the evening the Club held their annual dinner, at which short speeches were made by Mr. E. A. Robert and Col. J. E. Hutcheson of the Tramways Company. Others present were: Prof. L. A. Herdt, of the Tramways Commission, W. C. Finlay, H. R. Mallison, W. F. Graves, P. W. Dubee, A. Gaboury, E. Blair, A. S. Byrd, K. B. Thornton, and H. E. Smith.

Home Appliances Manufacturing Co., Ltd., is a new firm recently incorporated to manufacture and sell wholesale or retail, electrical appliances. Capital stock, $250,000. Headquarters, Winnipeg, Man.



Who Can Estimate the Value of a Window?

It is impossible to estimate the sales value of a well dressed window. The character of an entire business may be altered by the superior class of trade attracted by a good looking store front.

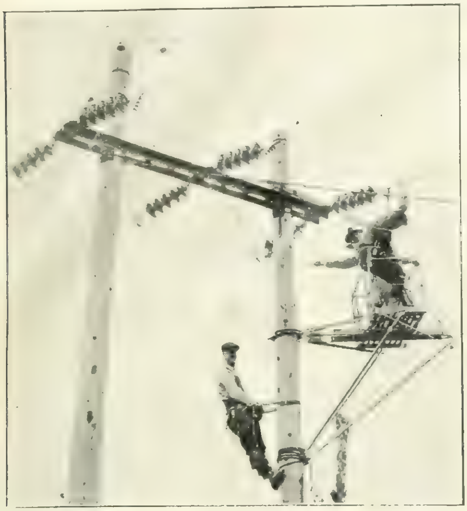
The space occupied by the window is the most valuable part in the entire store. Your windows are worth all the thought, time and money you can put into them.

The Canadian General Electric Co., Limited, are firm believers in the sales value of attractive windows. They maintain a Window Dressing Department in charge of an expert free window dresser. The service of this department is free to their customers under certain conditions, which will gladly be explained upon request.

The photograph of one of the Canadian General Electric windows, which was taken at night, illustrates the value of proper illumination.

The Bush "Safety Staging"

The Bush Electric Company, Cleveland, have devised a new scheme for protecting linemen when working on live transmission lines. The underlying principle consists in putting the protecting insulation between the men and the ground, instead of between the men and the line. The problem has thus been one of figuring the proper insulation and this they claim to have solved in their new "Safety Staging"



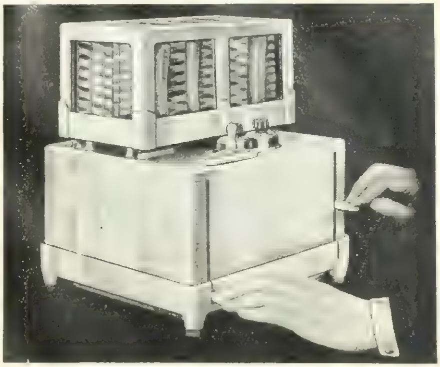
This is made of selected hardwood submitted to a special drying and impregnating process. With the staging properly placed, the man is free to touch the live line at any time and they claim that in grasping or releasing the line there is no discomfort whatever. They guarantee satisfactory results up to 110,000 volts and state that this limit will be soon extended.

Columbia Hot Shot Batteries for Vacation Lighting

During the vacation season, the Canadian National Carbon Company of Toronto, Canada, is using large space in magazines, newspapers, and on billboards for the advertisement of the Columbia Hot Shot Battery as a ready source of current for lighting purposes. The Hot Shot is for the summer home outside the limits in which electrical power companies operate, and for camps, cottages and tents it provides an ideal means by which a convenient, safe, effective light may be had. It is as ready for use as the electric light at home, and anyone can install the simple system at very small cost. The whole outfit occupies but little space in a camping equipment—hardly more than an old fashioned oil lantern—and all that is necessary to render it instantly available is ta make the connections. It is a dry battery of from three to twelve cellpower, a size for every need. There are only two binding posts to connect up, just as with one ordinary dry cell For one light the necessary equipment is one Hot Shot No. 1561 (5 cell-power); one 6 volt, 2 candle-power, double contact tail lamp; one double contact Bayonet socket; one snap switch; and from 10 to 15 feet of No. 18 lamp cord. This lighting system is also highly effective for garages, barns, stables, and all other outbuildings, as well as closets, cellars, attics, lofts and porches.

An Automatic Toaster

An automatic timing arrangement to interrupt the current after the toast is made is incorporated in a toaster for hotels and restaurants, manufactured by the Strite Automatic Toaster Company, Minneapolis, Minn. After the toast is done it is automatically raised out of the machine and allowed to rest on top of the over above the warm grid.



A lever operating along a scale permits adjustment. The machine is made of polished aluminum and has five heating elements. It is made in a four- slice size, but switches are so arranged that either or both of the end elements may be cut out when toasting two or three pieces of bread. The toaster may be had for operation at either 110 volts or 220 volts and has a full capacity rating of 2,750 watts. The machine is 12 in. square, 14 in. high and weighs 18 lb.

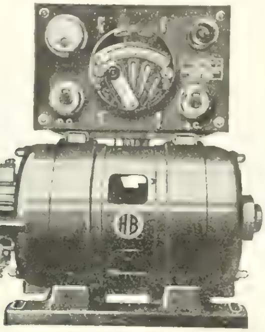
Could Not Operate at Present Rate

At the hearing of the appeal made by the municipality of Lauzon, Quebec, to force the Levis County Railway Company to operate its cars in the municipalities of Lauzon and St. Romuald, P. Q. Professor Herdt of McGill University, Montreal, stated that the company could not be expected to continue to operate with the present rate of fares and pay the higher wages asked for. The company was carrying passengers from Levis to St. Romuald at an actual loss of two cents per passenger, and as the Levis County Railway was not a "street railway," but rather an "urban electric railway" it should be entitled to charge what was allowed the ordinary railways, three cents a mile. Professor Herdt went on to say that the company just managed to make ends meet, that is, paid bare expenses, without interest or anything else, with the 6.3 cent fares per passenger. He suggested, as a remedy, a zone system, by which two fares would be paid going east, one from Levis to Bienville and another from Bienville to Lauzon, and on the western end of the line a fare from Levis to Hadlow, a second fare from Hadlow to Bennet Hill, and another from that point to St. Romuald.

The first annual business meeting of the Town Planning Institute of Canada, held recently at the Chateau Laurier, Ottawa, was largely attended by engineers, architects, surveyors and landscape artists from all parts of Canada. The Institute is but in its infancy, having been formed only last year in Toronto. The first meeting therefore consisted chiefly of the formulation of a constitution and the discussion of an extensive plan of organization

New Battery Changing Outfit

Battery Service & Sales Co., 113 King St. W., Hamilton, Ont., have brought out a new battery charging outfit, of eight battery capacity that is especially designed for the garage catering to the storage battery business. This battery charger is a full 500 watt set, equipped with capacity and efficiency that guarantees quick, dependable charging. It is self-starting and will operate on either alternating or high voltage, direct current. It has a special automatic universal voltage control, which makes it possible to recharge any automobile control battery successfully. It will handle automatically eight 6, 12, or 24 volt batteries at the same time.



It is high time that merchandising of electrical goods should be lifted out of the position of being mere side-lines for hardware, drug and jewelry stores.—M. K. Pike.

Which Is It to Be—Servant or Master? Don't Forget to Turn Off the Current

Electricity, like fire, is a good servant but a bad master. Proof of this is found in the fires, small in number though they may be, resulting from ignorance or negligence when handling electric irons. Every once in a while one reads in the papers that some careless housewife has forgotten to switch off the current and left the house, serenely unconscious of the force she has unleashed to work its terrible will in her home. A good illustration of the harm such carelessness can accomplish is given in a recent report of a fire at St. Catharines, Ont. A lady left the house for the day and forgot to turn off the current from the iron she had been using immediately before leaving. The ironing cloth caught fire and soon the whole house was in flames. Considerable damage was done before the fire was under contol. It is quite conceivable that where the houses are of frame construction a whole town might be jeopardized especially in the hot dry weather.

Too much emphasis cannot be given by dealers to their customers in warning them of the danger from such neglect. It has been suggested that dealers enclose a neat card with every purchase of electrical appliances, especially irons, bearing the warning in large letters:

Don't forget to turn off the current. It will prevent fires, and be money in your pocket.

Then a footnote:

Hang this where you can see it.

Current News and Notes

Alice Arm, B. C.

The Dolly Varden Mining Co., Alice Arm, B. C., are building a 500 h.p. hydro-electric plant.

Edmundston, N. B.

Madawaska Light & Power Co., Ltd., with head offices at Edmundston, have been incorporated with a total capitalization of $300,000.

Gorrie, Ont.

The Howick town council will submit a bylaw to the ratepayers for permission to install a hydro-electric plant.

Hamilton, Ont.

Messrs. Piggott & Healey Construction Co., 36 James St. S., Hamilton, Ont., general contractors for a new factory in Barton township, will sub-let the electrical work.

Kingston, Ont.

The Canada Electric Co., 175 King St. E., Toronto, have been awarded the contract for the electrical work on the new theatre at Kingston, Ont.

Lynn Valley, B. C.

Tenders will be received until Aug. 1 for the electrical work on the new school at Lynn Valley, B. C.

Liverpool, N. S.

The Liverpool, N. S., city council are rebuilding their power plant. Generators will be installed.

Milltown, N. B.

Jos. McVey & Sons, St. Stephens, N. B., general contractors for the new school at Milltown, N. B., will sub-let the electrical work.

Montreal, Que.

J. E. A. Benoit, 1198 Wellington Ave., Montreal, Que., architect for a new R. C. school, wants prices on electrical fixtures and supplies.

J. A. Gagnon, 1377 Wellington St., Verdun, Que., is building a new departmental store on Wellington St., Verdun. Architects, Cardinal & Beauchamp, 26 James St., Montreal, will let the electrical work.

S. D. Vallieres, 370 Marlowe Ave., Montreal, Que., is building 12 residences on Northcliffe Ave., Montreal, and wants prices on electric fixtures.

The town council of Montreal East, Que., are erecting residences at a cost of $100,000. They want prices on electric fixtures. Secy.-Treas., J. E. Coderre, City Hall, Montreal East.

The month of June this year was not as big a fan month as was expected. But the hot weather will come alright. Be ready for it and rush in your display.

Sherbrooke, Que.

The Sherbrooke Protestant Hospital are calling for tenders for the erection of a power house.

St. Thomas, Ont.

The local Hydro-electric Commission recently declared a reduction of approximately 15 per cent. on all power rates in the city, the new order to be retroactive from June 1.

Sault Ste. Marie, Ont.

The Canada Electric Co., 175 King St. E., Toronto, have

ANNOUNCEMENT

ENAMELLED WIRE

We are pleased to announce that, at the request of a number of customers, we are installing a complete equipment for the manufacture of Enamelled Wire which we plan to have in operation by the end of May.

As this is a new departure as far as Canada is concerned we are sparing no expense to ensure this material being manufactured as well as is known to the Art.

Eugene F. Phillips Electrical Works
Limited

Head Office and Factories - MONTREAL

[illegible] awarded the contract for the electrical work on the new theatre at Sault Ste. Marie, Ont.

Stratford, Ont.

The Stratford Flax Co. are erecting a new flax factory on Romeo St., Stratford, Ont., and will let the electrical work.

St. Stephen, N. B.

The [illegible] Fire & Electric Co. (Messrs. C. A. Ryder and [illegible]) have recently opened an electrical store at St Stephen, N. B., and will carry an up-to-date stock of fixtures and appliances.

Sudbury, Ont.

F. McGregor, Rothchild Block, Sudbury, Ont., has been awarded the contract for the electrical work on the new Mining & Technical school at Sudbury.

Saskatoon, Sask.

The contract for wiring the new $500,000 Normal school at Saskatoon, Sask., has been awarded to C. D. Kirk, Winnipeg, Man.

Many people sit on their front porch in the evenings. Think of the comfort of an electric fan during the summer and suggest a verandah receptacle. The fan will also keep the "skeets" and flies away.

Three Rivers, Que.

J. E. Lord, De La Verendry St., Three Rivers, Que., is in the market for electric fittings and supplies.

Toronto, Ont.

York township council recently passed the by-law for an issue of $385,000 debentures to provide the township's share in the cost of the Toronto-Bowmanville Hydro Radial line.

J. W. Commeford, 261 College St., Toronto, has been awarded the contract for the electrical work on a new public hall at the corner of Carlaw and Danforth Aves., Toronto.

The Western Canada Flour Mills Co., 74 King St. E., Toronto, are erecting an office building and warehouse at 295 McPherson Ave., Toronto, and will let the electrical work.

Walkerville, Ont.

The Walkerville Land & Bldg. Co., Walkerville, Ont., are erecting a new office building. The architect, Albert Kahn, Walkerville, will let the electrical work.

Winnipeg, Man.

The Standard Construction Co., Bank of Nova Scotia Building, Winnipeg, Man., general contractors for the new church on Home St., Winnipeg, wants prices on electrical work.

Hazelton & Walin, Ltd., 609 Electric Railway Chambers, Winnipeg, general contractors for the new $125,000 garage on Graham Ave., Winnipeg, Man., wants prices on electrical fixtures and supplies.

Windsor, Ont.

The Miller Yorke Elec. Co., 135 West Larned St., Detroit, Mich., have been awarded the contract for the electrical work on the new factory and power house of the Burroughs Adding Machine Co., Windsor, Ont.

Yorkton, Sask.

The Sun Electrical Co., Ltd., 1842 Scarth St., Regina, Sask., have been awarded the contract for the electrical work on the new court house at Yorkton, Sask.

Making Use of All Available Space

It is never possible to have too much display room, especially window display. Many stores with small windows have adopted the system of exchanging the dead boarded front of the space below a window for a glass front and turning it into display space. If carefully lighted this would be a good system for electrical dealers.

Have You a Slogan for Your Store

(Continued from page 42)

"Have We Wired Your House"—Collins Electrical Co., Springfield, Mass.

"Wire for Us and We'll Wire for You"—Star Electric Co., Bridgeport, Conn.

"If You Want the Best, We'll Do the Rest, Electrically"—Clegg-Perkins Equipment Co., Ottawa, Ill.

"The Electric Way Is the Right Way"—Wisconsin-Minnesota Light and Power Co., Eau Claire, Wis.

"Clark's 100% Service With Every Appliance"—Arthur Clark, Newark, N. J.

"The Store for Things Electrical"—National Electrical Supply Co., Washington, D. C.

"The Essential Way Is Easy to Pay"—Essential Sales Co., Brooklyn, N. Y.

The Moloney Electric Company have just issued Catalog 210, which is a nicely illustrated bulletin describing this company's transformers. A quantity of very useful and practical information is included, which constitutes the bulletin a sort of general text book on transformers.

Double the Life of Your Pole Lines
By using our
OPEN TANK TREATED
British Columbia Cedar Poles
They afford your pole lines better support, and add considerably to their appearance. Let us send you further particulars and prices. No obligation.
Lindsley Brothers Canadian Co., Ltd., Nelson, B. C.
Filer-Smith Machinery Company, Limited,
703 Confederation Life Building, Winnipeg, Man.
Irving Smith, 602 New Birks Building, Montreal.

Electrical Machinery and Repairs

Standard Armatures, Coils and Commutators in Stock. Material and Experience for Quick Thorough Repairs on Every Size or Type of A.C. or D.C. Machine.
Factory Recently Doubled. 100 Electrical and Mechanical Experts Anxious to Serve You
Cleveland Armature Works, Inc.
Est. 1895 Cleveland, Ohio Inc. 1918

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MacLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 296 Broadway
CHICAGO - - Room 803, 63 E. Adams St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, August 1, 1920 No. 15

Engineers are Legally Licensed in the Province of Alberta

By the Engineering Profession Act which was recently enacted, the province of Alberta recognizes the Association of Professional Engineers of that province. For the purpose of examination and representation upon the council, professional engineering is sub-divided into the following branches: Civil Engineering, Electrical Engineering, Mechanical Engineering and Mining Engineering. New branches may be formed on petition of members and ratification by the association. The interim council is composed of O. E. S. Whiteside, L. E. Drummond, F. H. Peters, R. J. Gibb, R. F. McCall, T. W. Hobson, W. R. Pearce R. A. Brown and R. L. S. Wilson, on the understanding that three months after the passing of the act a general meeting shall be called for the appointment of a regular council

Only a member of the association, or a person who has received a license from the council to do so, shall be entitled to take and use the designation "Registered Professional Engineer" or any abbreviation thereof, to hold himself out or advertise himself as a registered professional engineer.

The following persons shall be entitled to be registered as members:

(a) Any person domiciled in Alberta at the date of the passing of the act, who has been practicing as a professional engineer for five years;

(b) Any person domiciled in Alberta who is a registered member of an association of engineers of another province of the Dominion of equal standing and powers;

(c) Any person domiciled in Alberta who, in the opinion of the Board, possesses qualifications similar to those demanded by the act by reason of experience, training or examination by some other examining body, and,

(d) Any person domiciled in Alberta who passes the examinations and complies with the requirements set forth in the act.

The following persons are entitled to obtain from the registrar license to use the title of, and to be designated as, "Registered Professional Engineer":

(1) Any registered member of an association of engineers having the same or similar powers in some other province of the Dominion;

(2) Any person not coming within the provisions of (1), above, if he produces evidence of qualifications satisfactory to the council

Any person who, not being a registered professional engineer in the province, assumes that title or advertises himself as such, or acts in such a manner as to give the impression that he is such, shall be liable on summary conviction to a fine of not less than $50.00 and not more than $100.00, and for any subsequent offense, to a fine of not less than $100.00 nor more than $200.00.

Good Management and Increased Efficiency Offset Higher Costs

Once more the Toronto Hydro Electric System has demonstrated its ability to balance increased efficiency and good management against the ever increasing cost of supplying electric light and power, and, while maintaining rates almost identical with those prevailing before the war, show a surplus for the past year's operations.

The Toronto Hydro is the people's system and "the people" must indeed be gratified with the annual report. They also have the satisfaction of feeling that in spite of the appalling increases that have taken place in prices—increases that almost overwhelm the average citizen—here is one thing that is just as essential as ever, just as good in quality as before the war, and yet the price has not been increased. Pondering over the comparative prices of house rents, foods, shoes, clothing, and so on, the citizens must indeed appreciate purchasing this same essential commodity at the old rates.

It is well worthy of note, too, that in spite of the continued low rates and the net surplus which is always in evidence in the annual report of the Toronto Hydro, the system is being properly maintained and reserves and sinking funds regularly increased by their proper increments. A reserve fund for the replacement of buildings, plant and equipment stands at $1,635,701. A sinking fund for the retirement of debentures as they mature has $910,100 set aside and other funds bring the grand total up to something over three million dollars. The total assets of the system have now reached the large sum of $11,591,794 against which there is a net bonded debt of $8,244,533. The gross income for the year 1919, which this report covers, was $2,504,758. Of this amount sale of current for lighting yielded $946,313; for power, $1,120,944, and for street lighting, $322,773. The net surplus stands at $101,447.

From an executive point of view, perhaps, the most striking item in the report is the statement that "despite the power shortage, the gross income increased by 6.4 per cent. over that of 1918." As a matter of fact this power shortage resulted in the connected load being reduced by some eight thousand horsepower and the total kilowatt hours sold by almost fifty millions. That a considerable increase in gross

[illegible]
[illegible] missioners in their report of "the exceedingly valuable work of the general manager, Mr. H. H. Couzens."

Further, regarding the power shortage, the report urges that the lesson—so far as Toronto is concerned—is a steam reserve plant. This would be used to capacity in case of interruptions to the Niagara supply or, as required, at peak load periods. The report takes note of the fact that such plant could not supply current at present Hydro rates, but considers that an uninterrupted supply of power is of such vital importance to manufacturers and others, that the additional cost would be of secondary and minor importance.

The report of the Toronto Commissioners is being widely distributed as indicating their entire confidence in its contents. In this connection, it is a privilege to pay a word of tribute to the splendid ability and tireless energy and enthusiasm of the Chairman of the Commission, Mr. P. W. Ellis, whose personal attention has been very largely responsible for the continued success of the system. The citizens of Toronto have undoubtedly learned with real gratification that Mr. Ellis and Mr. Wright have also consented to act on the Railway Commission. If the City of Toronto can look forward to a street railway system, under municipal ownership, as efficiently managed and as smooth running as the present Hydro System, there need be no hesitation on the part of electors to assume this obligation when the franchise expires.

Measurement of Power and Power-Factor

With the increasing use of electrical energy the measurement of power and power-factor becomes of ever greater importance. The terms "power" and "energy" are pretty well understood by the majority of power users but the term "power-factor" is very difficult to explain to the customer; as a matter of fact many electrical engineers do not seem to have any too clear an idea of what is meant by the power-factor of polyphase loads, especially when those loads are underbalanced. Power companies sell power and consumers buy it with penalties for low power-factor while the methods used for measuring the power-factor are subject to quite large errors under conditions of unbalanced load. True, in the majority of cases the power company calls, in its contract, for a balanced load, but it is difficult to distribute single phase loads in a plant to get a perfect balance and in many cases the line voltage is somewhat unbalanced and then the unbalance of load is not the fault of the customer. The method of measuring energy consumption and power-factor by means of two single phase wattmeters or watthour meters is correct only on balanced loads and is [illegible] loads.

A second method of measuring power factor by means of two polyphase wattmeters, one connected in the ordinary way to measure power and the second with its current coils in two of the lines and the corresponding potential coils across the opposite phases, has been used very extensively and has been considered to give fairly accurate results. A statement which appeared in the Electrical World of March 27th, 1920, page 721, by Mr. C. E. Brown, that this method is incorrect, without giving any idea of the degree of the error introduced, is liable to cause a good deal of uneasiness in the minds of both power sellers and power users.

In an article in this issue the error in the measurement of power factor of certain assumed loads is worked out and a proof given that the third method of measurement advocated by Mr. Brown in his article is correct on unba-

Spot Welding Rapidly Gaining in Popularity

By F. K. Dalton, B.A.Sc.

When the subject of electric welding is mentioned one usually calls to mind, first, the electrical arc welding process, but in doing so he is giving spot welding a second place. This is probably due to the fact that arc welding is used on the heavier work and is more frequently brought to the attention of the reader of electrical literature.

Spot welding, however, is rapidly gaining ground in replacing riveting where manufacturers are appreciating the advantages in strength, speed and the saving in cost which may be realized by installing the machines and using them wherever possible. These are points of real interest to the efficiency engineer and the factory superintendent.

As the name implies, spot welding is a process by which welding is done in spots, the strength of the welded joint being roughly proportioned to the number of good spots and in many cases even greater than that of the metal itself. The scope of this process does overlap to a certain extent the field of the arc welding process. It must be remembered that where such overlapping occurs spot welding very much exceeds arc welding in speed and does not add to the weight of the parts being welded. There remains, of course, the work of reclaiming broken pieces of metal of large cross-sectional area, which can never be done by the spot welder.

In the matter of joining sheets of metal of about three-fourths of an inch in thickness, this work may be done by spot welding, arc welding, or by both processes together. The spot welder, however, can be used successfully for the joining of thin sheets where the arc welding process is too fast, burning and melting the metal.

Spot Welder Replaces Riveter

Obviously the field of the spot welder is in doing all of the work previously accomplished by the riveter, and in many respects doing it more quickly and better than by riveting. In the first place it is obvious that a riveted joint cannot possibly have a strength equal to that of the metal in the undrilled sheet. There is no drilling in spot welding and by making a sufficiently large number of spots the joint may easily become stronger than the sheets being welded together. Any more spots, then, are needless.

The saving in time of welding over that required for riveting is not so important. The chief gain in this direction being in the entire elimination of a number of preliminary operations which also means a saving in labor. It is worthy of note here that working, punching and drilling are not necessary in welding. With riveting good metal is cut away to make room for the softer metal of the rivet. This is the reason that the rivet joint has less strength than the plate and there is usually an addition in weight due to the rivet heads. The overlap of material is not so great as in a riveted joint. With spot welding, therefore, there is considerable saving in metal.

There is but one important disadvantage of the spot welding process; it is a single phase intermittent load which, with a system of small capacity, will seriously affect the voltage regulations of the distributing lines. If several spot welders are used, however, they can be so placed on the different phases that the disturbance is very much reduced.

Up to the present time, the largest steel plates successfully joined by spot welding have a thickness of about three-fourths of an inch as previously mentioned. Only two plates were thus welded at one time. This required a machine capable of exerting a pressure between the electrodes of about fifteen tons the current being seventy-five thousand amperes (a.c.)

Machines for spot welding are manufactured in various sizes ranging from the small welder, exerting a pressure of a few pounds at the electrodes and using four or five hundred amperes, to the huge device mentioned above which has hydraulic arrangements to give the pressure and a transformer of approximately 6,000 kv.a capacity to supply the current. Where such large currents are used the reactance of the secondary loop, including electrodes and transformers, may be so great that it definitely limits the current obtainable. The only remedy for this is to shorten the loop by putting the transformer quite close to the electrodes. Another difficulty here presents itself where large steel plates are to be welded. In order to make a spot weld near the centre of the plate the electrodes must reach to a considerable distance over and under these plates. Hence for a given piece of work there is a minimum limit to the length of the secondary circuit. In order to overcome this difficulty the duplex spot welder was designed, with two electrodes above and two below the plates being welded. Two transformers are used and each is placed in very close proximity to one pair of electrodes, which form part of their secondary circuit. The path of the heavy current is extremely short and the trouble from reactance in the loop is much reduced. This duplex welder makes the spot welds in one operation thus increasing the speed of welding, as well as the efficiency.

Re Switches on Washing Machines

Winnipeg, July 9, '20

Editor, "Electrical News,"

I was very pleased to read the comments of your correspondents on my letter in your issue of July 1st, but would like to point out that some of the safeguards suggested by Mr. Buchanan are not obtainable in actual practice.

In the first place, the connections of a single pole switch to the underground wire on any portable device cannot be secured in practice as the polarity of the wires in the extension cord varies depending upon the wiring up of the socket or fixed receptacle into which the attachment plug is inserted; further, there is, as yet, no system of identifying the grounded wire of circuits in force in either Canada or the United States. It is true that the new edition of the National Code will, I understand, bring in some provision of this nature, but, even so, they are not retroactive and therefore would not apply to hundreds of thousands of existing installations where washers will be connected.

Secondly, equal difficulties exist as to Mr. Buchanan's third suggestion—grounding of the metal parts—this would presuppose the use of a three-wire cord and a three-wire plug to be inserted into a fixed three-wire receptacle to which a ground wire is attached. Supposing a rule was made calling for this protection, how can it be enforced? It is all very well to theorize on these points, but the question is, are Mr. Buchanan's suggestions feasible? I claim that they are not and for that reason I maintain that the safest installation would consist in a pull-out form of attachment plug with heavy reinforced cord running direct to the concealed terminals of the motor.

In regard to Mr. Mahon's remarks, I understand that the Hydro-electric Commission will take care of the matter of guards for belts, etc., in their new standard specifications now under consideration. His point is well taken and should be taken care of by some authority.

Yours truly,

F. A. CAMBRIDGE,

City Electrician.

Manufacturers—What of the Tariff?

There are two big questions agitating the mind of the Canadian public—

Shall we buy Made-in-Canada goods?

Shall we continue to protect Canadian manufacturers?

Let us reason the thing out.

The sentiment of the Canadian people undoubtedly shouts "yes" to both questions.

But sentiment, to live, must be reciprocated.

What happens?

Foreign demand comes in. Higher prices are offered to the manufacturers. The home market is neglected. Those who would buy Canadian-made goods cannot get them because they are being supplied to foreign countries.

Or the price, protected by the tariff, is made prohibitive.

The manufacturer forgets about sentiment.

The home consumer is "sore."

Rightly so.

It's a poor rule that won't work both ways.

What happens next?

The consumer goes without or buys foreign goods—partly from necessity, partly because he feels that the so-called sentiment is one-sided.

And he pays duty

And, naturally and surely argues thus:

"Why should I pay duty

"To protect the manufacturer who is making Canadian goods

"And then neglects the Canadian market?

"Let's reduce the tariff."

If

The Canadian manufacturer expects the Canadian people to be loyal to him—

To support a protective tariff and buy Made-in-Canada goods

He must be loyal to them.

He must see to it—

That the home market is supplied first,

That the home price is based on cost of production,

And **not** on foreign demand,

Nor on the protection the tariff gives him.

Without doubt, the majority of Canadian manufacturers have been four-square with their old customers, but the average citizen sees only the "pirate." We all admit the existence of this species. He has ignored customers of long standing and set prices not justified by costs.

A case in point:

It has been brought to our attention that a certain industry has been exporting eighty per cent. of its output to the United States. It has absolutely refused to sell to Canadian customers; some of whom have been forced to suspend operations in consequence. Further, the finished product for which it also supplies raw materials is sold in the United States at a lower price than the same product is sold to Canadians —by more than the amount of the duty. Further still—a combine makes it impossible for Canadians to buy in the States at the lower price.

The question is:

Shall we allow the "pirate" to wreck Canada's industries?

He must be curbed—it goes without saying.

Otherwise the people of Canada will accept him as typical of the manufacturing industry.

They will demand a removal of the tariff,

Throw sentiment to the four winds,

And buy in the cheapest and easiest market

When the Dominion government gets around to the tariff question, the Electrical News may have something further to say.

Accurate Methods of Measuring Power-Factor

On Unbalanced Three Phase Loads the Usual Methods of Measurement are Subject to Serious Errors—Method Described that Gives Accurate Records

By C. V. Christie*

When power-factor clauses are inserted in power contracts it is very necessary that the method employed in obtaining the power-factor should be correct or that a definite agreement should be reached between the central station and the customer as to which of the approximate methods is mutually satisfactory.

When the three-phase load is balanced all the ordinary methods are equally correct but as shown in the following article, when the loads are not balanced the simpler methods of power-factor measurement are subject to serious errors, and for any other than the smallest loads it would usually be worth while to go to a little greater expense and trouble and be sure that the result obtained is accurate.

When the load is balanced the power consumed in a circuit can be measured by means of two wattmeters, W_1 and W_2, connected as shown in Fig. 1. Power $= W_1 + W_2$. The power-factor $\cos\phi$ can also be determined, since

$$\tan\phi = \sqrt{3}\,\frac{(W_1 - W_2)}{(W_1 + W_2)}.$$

If the wattmeters W_1 and W_2 are replaced by two watt-hour meters, the sum $W_1 + W_2$ gives the total watt-hours delivered during the given time, and the difference $W_1 - W_2$ is proportional to the number of reactive volt-ampere hours delivered during the same time.

As before, $\tan\phi = \sqrt{3}\,\frac{(W_1 - W_2)}{(W_1 + W_2)}$ where $\cos\phi$ is usually called the average power-factor. It could better be designated the energy-factor during the given time. It must be clearly realized that this value of $\cos\phi$ is not an average of the instantaneous values of power-factor during the time but is simply a factor which when applied to the watt-hour or kilowatt-hour load taken by the customer will enable the central station to determine how many reactive volt ampere hours have been delivered.

This energy-factor or average power-factor when taken over a long period, as a week or month, is used as a basis for determining the penalty a customer must pay if his power-factor is not up to the contract value. For instance, if a customer during the month takes 100,000 kw.h. and the average power-factor is calculated as shown above and found to be 80%, whereas his contract calls for 85%, he is charged for—

$$100{,}000 \times \frac{.85}{.8} = 106{,}350 \text{ kw.h. instead of } 100{,}000.$$

This method of determining average power-factor is quite satisfactory with balanced loads but is subject to very grave errors when the loads on the three phases are not balanced, as is shown by the following examples:

Example (1) The circuit shown in Fig. 2 supplies a balanced three-phase load of 100 kw. at 80% power-factor and a single-phase load of 25 kw. at 100% power-factor connected between lines A and B.

The power-factor as calculated from the two wattmeter readings is 72.54 per cent.

With the same single-phase load connected from B to C instead of from A to B, the power-factor works out as 96.9 per cent.

With the same single-phase load connected from A to C the power-factor is 85.72 per cent.

The total power supplied by the circuit is $100 + 35 = 125$ kw. and the total reactive kilovolt amperes $= \frac{100 \times .6}{.8} = 75$ kw.

$$\tan\phi = \frac{\text{reactive kilovolt amperes}}{\text{kilowatts}} = \frac{75}{125} = \frac{3}{5} = .6$$

$\cos\phi = .8572$ and the average power-factor is 85.72 per cent. as given in the third case.

When the single-phase load is a non-inductive load and is connected across the two outside wires the power-factor as determined from the readings of W_1 and W_2 is correct.

In working out these results W_1 and W_2 were considered as wattmeters but they can be replaced by watt-hour meters without changing the results.

Example (2) Consider the same balanced three-phase load of 100 kw. at 80% power-factor and connect a static condenser of 25 kv.a. rating across the phases in turn.

When connected from A to B the reading of W_2 is not changed and, therefore, the calculated power-factor is not changed and is still indicated as 80%.

When connected from B to C the reading of W_1 is not changed and the calculated power-factor remains as before.

The kilowatts supplied $= 100$.

The reactive kv.a. supplied $= \frac{100 \times .6}{.8} - 25 = 75 - 25 = 50$ in each case.

$$\tan\phi = \frac{\text{reactive kv.a.}}{\text{kilowatts}} = \frac{50}{100} = .5$$

$$\cos\phi = .893$$

And the actual power-factor $= 89.3\%$.

The two wattmeters still give the true power-factor of the balanced three-phase load but not the power-factor of the combined load.

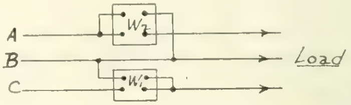


Fig. 1

When the condenser is connected from A to C the reading of W_1 is reduced by $\frac{\sqrt{3}}{2} \times 25$, *i.e.* 21.6 kw., or from 71.6 to 50, while the reading of W_2 is increased by 21.6 kw. from 28.4 to 50.

$\tan\phi = \sqrt{3}\,\frac{W_1 - W_2}{W_1 + W_2} = 0$ and $\cos\phi = 1.00$ indicating a power-factor of 100%.

Example (3) A pure inductive load of 25 kv.a. connected from A to B or B to C would leave the readings of W_1 and W_2 unchanged but the actual power-factor of the combined load would be lowered

$$\tan\phi = \frac{\text{reactive kv.a.}}{\text{kilowatts}} = \frac{75 + 25}{100} = 1.$$

$\cos\phi = .707$ and the actual power-factor $= 70.7\%$.

If connected from A to C the reading of W_1 would be increased by 21.6 kilowatts to 93.2, and W_2 would be reduced by 21.6 kilowatts to 6.8 kw.

$$\tan\phi = \sqrt{3}\,\frac{W_1 - W_2}{W_1 + W_2} = \sqrt{3}\,\frac{93.2 - 6.8}{93.2 + 6.8} = \frac{\sqrt{3} \times 86.4}{100} = 1.5$$

$\cos\phi = .556$ and power-factor $= 55.6\%$.

When two polyphase wattmeters or watt-hour meters are

---

[*] [illegible]

employed to obtain the true energy and reactive kv.a. supplied to a circuit, they are usually connected as shown in Fig. 3, with the addition of potential and current transformers.

When the load is balanced and has a power-factor cos ϕ, the sum of the readings W_1 and W_2 of the two elements of the power meter $= P = \sqrt{3}EI \cos\phi$ and is the true power supplied to the circuit.

Each of the two elements of the reactive meter gives an indication $W_3 = W_4 = EI \sin\phi$ and the indication of the meter $= R = 2EI \sin\phi$.

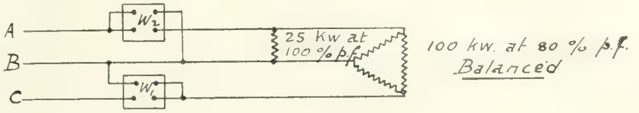


Fig 2

The actual reactive volt amperes supplied $= \sqrt{3}EI \sin\phi = \frac{\sqrt{3}}{2}R.$

$$\text{The power-factor} = \frac{\text{watts}}{\sqrt{(\text{watts})^2 + (\text{reactive volt-amperes})^2}}$$

$$= \frac{P}{\sqrt{P^2 + \frac{3}{4}R^2}}$$

To determine whether this method of power-factor measurement is correct on unbalanced loads it is only necessary to see what indications are given on the reactive meter when equal single-phase loads are connected across the various phases in turn. The power meter measures the true power under all conditions.

(1) If a static condenser taking a current I' is connected from

A to B, W_3 indicates $EI' \cos 30 = -\frac{\sqrt{3}}{2}EI'$; $W_4 = 0$;

$$\text{and } R = W_3 + W_4 = -\frac{\sqrt{3}}{2}EI'.$$

The corresponding volt-amperes $= \frac{\sqrt{3}}{2}R = -\frac{3}{4}EI'.$

Thus the reactive component meter only indicates 75% of the actual single-phase reactive volt-amperes.

(2) When the single-phase capacity load is connected from B to C the same result is found.

(3) With the capacity load from C to A,

$$W_3 = -\frac{\sqrt{3}}{2}EI',\ R = W_3 + W_4 = -\sqrt{3}EI'.$$

The reactive volt-amperes indicated $= \frac{\sqrt{3}}{2}R = -\frac{3}{2}EI'$ and the reactive meter indicates 150% of the single-phase capacity load.

With single-phase resistance load with current I'.

(1) Load connected A to B –

$W_3 = -\frac{1}{2}EI'$; $W_4 = 0$. Reactive volt-amps. $= \frac{\sqrt{3}}{2}\left(-\frac{1}{2}EI'\right)$

$= -\frac{\sqrt{3}}{4}EI' = -.433\ EI' = 43.3\%$ of the watt load, but it is indicated as a leading component.

(2) Load connected B to C –

$$W_3 = 0 \qquad W_4 = \frac{1}{2}EI'$$

Reactive volt amperes $= \frac{\sqrt{3}}{2}\left(\frac{1}{2}EI'\right) = \frac{\sqrt{3}}{4}EI'$

$= .433\ EI' = 43.3\%$ of the watt load, but it is indicated as a lagging component.

(3) Load connected C to A

$$W_3 = \frac{1}{2}EI \qquad W_4 = \frac{1}{2}EI \qquad (W_3 + W_4) = 0$$

and the meter indication is correct.

With a single-phase inductive load from A to B or B to C, the reactive volt amperes would be indicated as 75% of their true value, while when connected C to A, 150% of the true value is indicated.

EXAMPLE (A).

As an example take a three-phase balanced load of 100 kw. at 80% power-factor, 60% reactive factor—100 kw. and 75 kv.a. reactive. Add a single-phase load of 25 kw. 100% power-factor from (1) A to B; (2) B to C; (3) C to A. See Fig. 3. In each case the meter indicating true power shows 125 kw.

In case (1) the reactive component meter shows $(75 - .433 \times 25) = (75 - 10.8) = 64.2$ kv.a.

$\tan\phi = \frac{64.2}{125} = .514$; $\cos\phi = .8894$; indicated power-factor = 88.94%.

In case (2) the reactive meter shows $(75 + 10.8) = 85.8$ kv.a.

$\tan\phi = \frac{85.8}{125} = .686$; $\cos\phi = .8247$; indicated power-factor = 82.47%.

In case (3) the reactive meter shows 75 kv.a.

$\tan\phi = \frac{75}{125} = .6$; $\cos\phi = .8572$; indicated power-factor = 85.72%, which is correct.

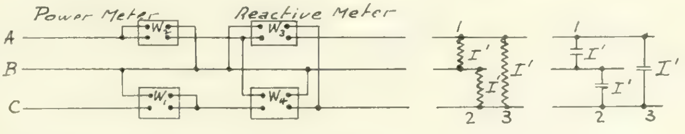


Fig. 3

EXAMPLE (B).

With the same balanced load add a capacity load of 25 kv.a.. The total power is 100 kilowatts.

In cases (1) and (2) the reactive meter shows $(75 - \frac{3}{4} \times 25) = 56.25$ kv.a.

$\tan\phi = \frac{56.25}{100} = .5675$; $\cos\phi = .8715$; indicated power-factor = 87.15%.

In case (3) the reactive meter shows $(75 - \frac{3}{2} \times 25) = 37.5$ kv.a.

$\tan\phi = \frac{37.5}{100} = .375$; $\cos\phi = .936$; indicated power-factor = 93.6%.

Actual value of reactive kv.a. = 75 − 25 = 50.

$\tan\phi = \frac{50}{100} = .50$; $\cos\phi = .893$; actual power-factor = 89.3%.

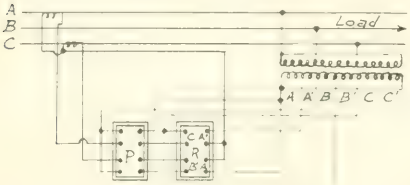


Fig 4

EXAMPLE (C).

With the same balanced load add an inductive load of 25 kv.a. The total power is 100 kw.

In cases (1) and (2) the reactive meter shows $75 + \frac{3}{4} \times 25 =$ 93.75 kv.a.

$\tan\phi = \frac{93.75}{100} = .9375$; $\cos\phi = .7296$; indicated power-factor = 72.96.

In case (3) the reactive meter shows $(75 + \frac{3}{2} \times 25) = 112.5$ kv.a.

$\tan\phi = \frac{112.5}{100} = 1.125$; $\cos\phi = .6685$; indicated power-factor = 66.85.

The actual value of reactive kv.a. = 75 + 25 = 100.

$\tan\phi = \frac{100}{100} = 1.00$; $\cos\phi = .707$; actual power-factor = 70.7%.

COMPARISON OF METHODS 1 AND 2 WITH UNBALANCED LOADS.

The results of the calculations made above are shown in the following table:

		Power-factor calculated by Method No. 1	Method No. 2	Correct value of power-factor
Resistance load,	A–B	72.54	88.94	85.72
	B–C	96.90	82.47	85.72
	C–A	85.72	85.72	85.72
Capacity load,	A–B	80	87.15	89.3
	B–C	80	87.15	89.3
	C–A	100	93.6	89.3
Inductive load,	A–B	80	72.96	70.7
	B–C	80	72.96	70.7
	C–A	55.6	66.85	70.7

The power factor as calculated from the two single-phase wattmeters (Method No. 1) is subject to very serious errors and should only be used where the load is known to be balanced and where the line voltages are balanced.

Method No. 2 is subject to considerable errors, the values given being sometimes too high and sometimes too low, but it is much more nearly correct than Method No. 1.

In these calculations the load has been taken as a balanced three-phase load of 100 kw. at 89% power-factor with the addition of a single-phase load of 25 kv.a. placed as indicated in the table.

METHOD NO. 3.

A third method has been used by the Commonwealth Edison Company of Chicago, and is described in the Elec. World, March 27th, 1920, p. 721. See Fig. 4. A standard polyphase service type meter is used to register the reactive component of the load. The meter is connected with its current coils in series with the corresponding current coils of the watt-hour meter and its potential coils from one terminal to the middle or half tap on the secondary of the potential transformer connected across the opposite phase. This connection is made so that the potential across the reactive meter is 90 degrees behind that across the corresponding element of the energy meter. This potential is 86.6% of the line potential.

With a balanced load of current $I_A = I_B = I_C = I$ power factor $\cos\phi$, the torque of the upper element of the reactive meter is proportional to $E_{CA'}I_A \cos(60-\phi)$ and the reading of the lower element is $E_{B'A}I_C \cos(60+\phi)$. The combined reading is $E_{CA'}I_A\{\cos(60-\phi) - E_{B'A}I_C \cos(60+\phi)\}$

$$= .866EI\{\cos(60-\phi) - .866EI\cos(60+\phi)\}$$
$$= .866EI\{\cos(60-\phi) - \cos(60+\phi)\}$$
$$= .866EI\{\cos 60.\cos\phi + \sin 60.\sin\phi - \cos 60.\cos\phi + \sin 60 \sin\phi\}$$
$$= .866EI \times 2 \sin 60 \sin\phi$$
$$= \frac{\sqrt{3}}{2} EI \times 2\frac{\sqrt{3}}{2} \sin\phi = 1.5EI\sin\phi = R.$$

The actual reactive volt-amperes $= \sqrt{3}\,EI\sin\phi = \frac{2}{\sqrt{3}}R$ where E is the voltage between lines, I is the current per line, R is the reading of the reactive meter, P is the reading of the watt-hour meter.

The required power-factor is obtained as—

$$\cos\phi = \frac{P}{\sqrt{P^2 + \frac{4}{3}R^2}}$$

This method indicates the correct power-factor for balanced loads and for unbalanced loads so long as the voltage is not unbalanced.

The third potential transformer from C to A may be omitted.

To prove that Method 3 is correct under all conditions of load, provided the voltages are balanced, it is only necessary to show that the reactive meter will indicate correctly a single phase load connected across any phase. At this late date it is not necessary to prove that the energy meter indicates correctly the energy consumed in the circuit.

Referring to Fig. 4 and the vector diagram in Fig. 6—the upper element of the reactive meter R is energized by the current of line A and the potential $E_{CA'}$ while the lower element is energized by the current in C and the potential $E_{B'A}$. These two potentials are indicated by the heavy arrows in Fig. 6.

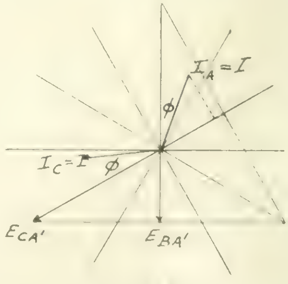


Fig 5

The indication of the reactive meter R must be multiplied by $\frac{2}{\sqrt{3}}$ to obtain the true reactive component.

Consider in each case a single phase load of current I'.

Case (1), a resistance load connected from A to B: the current I'_1

is in phase with the voltage E_{AB} and is in quadrature with the voltage $E_{CA'}$ and, therefore, the torque on the upper element is zero. There is no current in line C and, therefore, no torque on the lower element.

Case (2), a resistance load from C to A: the current in line C is I'_2 in phase with the voltage E_{CA} and 30 degrees ahead of the voltage $E_{CA'}$, while the current in line A is $-I'_2$ and is 150 degrees ahead of the voltage $E_{B'A}$.

The indication of the reactive meter is

$$R=E_{CA'}I' \cos 30+E_{B'A}I' \cos 150,$$

but $E_{CA'}=E_{B'A}=\frac{\sqrt{3}}{2}E$ and, therefore, $R=\frac{\sqrt{3}}{2}EI'\frac{\sqrt{3}}{2}+\frac{\sqrt{3}}{2}EI'\left(-\frac{\sqrt{3}}{2}\right)=0.$

Case (3), a pure capacity load connected from A to B: The current I'_3 leads E_{AC} by 90 degrees and is in phase with $E_{CA'}$ and the meter would indicate $E_{CA'}I'=\frac{\sqrt{3}}{2}EI'=R$ and the reactive volt amperes of the circuit would be given as $\frac{2}{\sqrt{3}}R=\frac{2}{\sqrt{3}}\times\frac{\sqrt{3}}{2}EI'=EI'$ which is correct.

The current in practice is supplied through current transformers and is, therefore, reversed from the direction shown in the diagram, and this reactive component is, therefore, shown as negative $=-EI'$.

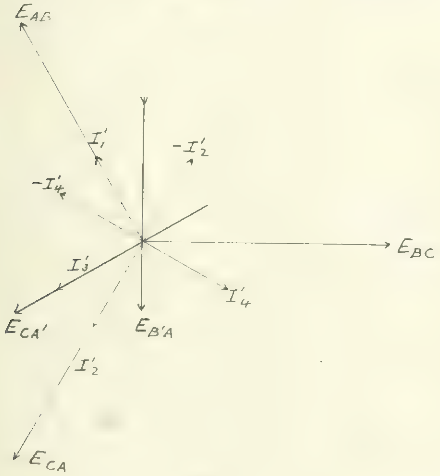


Fig. 6

Case (4), a capacity load connected from C to A: the current in line C is I'_4, 90 degrees ahead of E_{CA} and the current in A is $-I'_4$.

The indication of the reactive meter is

$$R=E_{B'A}I' \cos 60+E_{CA'}I' \cos 60=2\times\frac{\sqrt{3}}{2}EI'\times\frac{1}{2}=\frac{\sqrt{3}}{2}EI'.$$

And as before this is to be multiplied by $\frac{2}{\sqrt{3}}$ and reversed to give the true reactive component $=-EI'$.

Similarly an inductive load of EI' volt-amperes on any phase is indicated correctly on the reactive meter.

This method of connecting meters gives the correct reactive kv.a. or kv.a.-hrs. under all conditions of load, balanced or unbalanced, so long as the voltage balance is maintained. The errors due to the voltage unbalance encountered on commercial lines should be comparatively unimportant.

C. Holmes, Ann St., Thorold, Ont., has been awarded the contract for wiring 10 residences at Thorold, Ont.

Retail Firm States Women Just Commencing Their Electrical Education

The first six months of this year brought to one firm as many sales of electric washing machines as the whole of last year. They state truly that women are only just beginning their education along electrical labor saving lines. The manager made the remark that "women are still inclined to think of washing apparatus in terms of washing tubs and the other paraphernalia of the old regime, when the whole outfit only cost a few dollars. Thus when the price of a washing machine is put up to them they think it costly. To such people must be told the actual facts in no uncertain manner. They must be made to see that under these new conditions slaving at the washtub with tired arms and aching back is a thing of the past; that if they have not hitherto done their own washing the money spent on laundry can be saved by doing the washing at home with ease, and that instead of having to spend the greater part of a day at the tub, an hour with the ordinary number of soiled clothes will be sufficient." He further said that "a few years ago if after a three quarter hour talk with a prospect I got an order for a washer I nearly fell over, while If I got an order by phone I felt like taking a week's holiday."

Electric Current in Water Acts as Screen to Prevent Passing of Fish

To prevent fish from being carried into irrigation ditches a Western man has devised an electrical screen, the scheme being to pass an electrical current through the water at the intake of the canal. It has been in use at the Utah state hatchery for some months and is now being installed for experimental purposes in Yakima County, Washington.

The Sangamo Electric Company have just issued a bulletin, No. 54, relating to their type D. 5 watthour meters. Complete information and instructions are given, with splendid illustrations. These latter include diagrams for connecting up both two wire and three wire d.c. watthour meters.

Forget It

If you see a tall fellow ahead of a crowd,
A leader of men, marching fearless and proud,
And you know of a tale, whose mere telling aloud
Would cause his proud head to in anguish be bowed,
It's a pretty good plan to forget it.

If you know of a skeleton hidden away
In a closet and guarded, and kept from the day
In the dark, and whose showing, whose sudden display
Would cause grief and sorrow and lifelong dismay,
It's a pretty good plan to forget it.

If you know of a thing that will darken the joy
Of a man or a woman, a girl or a boy,
That will wipe out a smile, or the least way annoy
A fellow, or cause any gladness to cloy,
It's a pretty good plan to forget it.

Laboratories' Data.

Residence Lighting Not Up to Standard

Has Been Too Purely Utilitarian—Equipment Grossly Inadequate—"Effect" is the Most Important Result to be Sought

The matter of residence lighting was recently the subject of a spirited discussion before the Illuminating Engineering Society. Mr. Luckiesh introduced the subject.

Residence lighting has been the laggard in the march of progress. The attitude of the householder toward lighting has been too purely utilitarian; that is, it is similar to that with which fuel and food are viewed. Considered from the viewpoint of the potentiality of lighting, relatively little progress has been made in lighting the home. Lighting equipment in residences is grossly inadequate but this is due to the general lack of appreciation of what light can accomplish toward making a house a home. One of the fundamental deterrents is the concentration of attention upon fixtures as objects rather than as a means to an end. Lighting effect is the important result and from this broader viewpoint of lighting, many fixtures appear aimless.

The broader viewpoint of lighting can be achieved best by considering light as a medium somewhat akin to those of the decorator. By "spraying" light upon the walls, ceiling, and various objects, certain effects upon the mood or expressiveness of the room are obtained. We can control the direction, distribution, and color of light as desired and by varying these, we can produce effects more positive and powerful than those produced by decorative schemes. And finally in lighting we have the superb quality of mobility which the decorator's media do not possess.

Lighting fixtures have a right to exist as vital sparks of ornament, but in general we should look beyond the fixtures to the effects upon the room. The home is the theatre of life and in it we find many moods and occasions. There is a need for the development of the lighting-artist. who with his depth of vision, artistic sensibility, sound technical knowledge, and demonstration rooms, will reorganize the presentation of lighting to the householder.

In general, lighting fixtures are designed, displayed, purchased and installed. This procedure has inhibited the development of an appreciation of the potentiality of light on the part of the householder. The fixture dealer (and others) should equip rooms for the purpose of demonstrating lighting effects upon a room. It has been shown that such a procedure awakens the householder to the great possibilities of lighting. When he sees lighting as a powerful factor in affecting the moods of his rooms and in making his house a home, the householder will recognize that the cost of lighting is insignificant. Adequate lighting equipment can do much to overcome monotony in a home. Decorative schemes are "anchored" for years and the householder attempts to escape monotony by rearranging furnishings, by adding a charming new note such as a vase of flowers, etc. But in the mobility of lighting we have a powerful ally, for by the pressure of a switch or two, the lighting may be changed from a quiet restive mood to a flood of light for a joyous company.

Analyses of lighting in various rooms were presented and especial emphasis was given to the deeper psychological effects. It was shown how this general treatment of the subject of lighting the home opens the eyes of the householder to the potentiality of lighting and how his awakened interest results in the installation of adequate lighting equipmen. Adequate wiring plans as installed in houses under this broader scheme of the presentation of lighting to the householder were shown.

The further discussion was very practical. One of the members pointed out that he had always made an effort to get to a point, not of efficiency of light but efficiency of tone, something that is attractive; something that will appeal. The strong light is ideal to attract a crowd and then gradually subdue the illumination to a harmonious color effect which people crave and find restful. That same thought is daily growing more in application to the home. The numerous floor lamps and the elimination of the ceiling fixtures are indications of the general trend. It will take only a few years of educational propaganda by the engineer co-operating with the artist to arrive at a point where we will have more in the way of a pleasant and satisfactory lighting scheme for residences.

Another member spoke of the various effects that could be produced on ceilings. That is generally a rather broad expanse without very much of a decorative feature. It is true, your eyes are not directed toward it a great deal, but there are times when it can serve a decorative purpose. Now, in addition to a single tint that might be thrown upon the ceiling by a direct or semi-indirect light, it is possible to place a glass over a lamp with a lot of different colors upon it, so we may get a nicely mottled effect on the ceiling, when so desired. Or, if we admire certain paintings or mural decorations we can use colored lantern slides and project them on to the ceiling. This probably would require considerable expenditure of energy, and perhaps you would not like to do it, but it can be used on special occasions for variety as well as for artistic effect.

Another member made reference to the attitude of the architect towards house lighting and said "Not long ago a very good architect designed a house for me and everything was first-class so far as the architect's design was concerned, excepting when it came to the last line of the specifications on the building. The last line read: "The fixtures will cost fifty-five dollars." Now, it is needless to say that the reason that he put it in that way was that he wanted to make the house cost a certain amount, and that is all the money he had left, but the balance, of course, was among the "extras."

This lack of appreciation of lighting by the architect I understand is quite general but I wish it were not so.

It was also related that in making a survey in Chicago they found in a great many homes that were visited that an effort had been made to beautify and improve the lighting equipment. The methods used were varied, indeed. The silk handkerchief over the hall or the living room fixture was perhaps the most common to subdue the bright light, and give color. The shawl effects over their tables and floor lamps were frequently found. Perhaps the most effective were the silk bag effects with a tassel at the bottom, hung around the semi-indirect bowls. This was a successful attempt to get away from the cold or glaring cheap light opal or C. R. I. glassware. In general, it seemed to be the tendency to sacrifice illumination efficiency to beauty.

A contractor spoke as follows: I am one of those contractors who resent the implication that we are indifferent in advising our customers regarding proper ilumination. To illustrate: A client desires to build a house costing ten thousand dollars. He asks the electrical contractor to estimate on the wiring, which may be five hundred dollars, but by the time the subject of lighting is reached, his cost has been over ten thousand dollars, possibly twelve thousand dollars, so he is looking for a place to cut, and decides that three hundred dollars is enough for wiring, and fixtures are usually regarded in the same way. So you can see that in the average case the final results to all concerned are very poor.

My policy has been entirely different. I lay out every thing I can think of for the owners to decide upon, and as a rule it is cut down, but the results are still good. I will illustrate several cases: An architect gave me a set of plans; asked me to lay out the entire electrical equipment. I estimated eleven thousand dollars. "No," he said, "too much." Finally I put in thirteen thousand dollars, and he had what he wanted.

Second case, building cost seventy-five thousand dollars. I estimated eighteen hundred for lighting. Owners tried to cut it down and finally said,"Give us what you can for five hundred dollars." This from people who could well afford to spend ten thousand dollars, and should not have failed to provide properly for lighting equipment.

Third case, a house was to cost two hundred and fifty thousand dollars. I was called in to estimate on illumination. Owners consented to a good "lay-out" costing about six thousand dollars. Upon receipt of the plans they called for me, and spent a whole day trying to economize and at midnight, with everyone worn out, they had saved about fifty dollars and were pleased with their effort toward economy. The house cost two hundred and fifty thousand dollars, and over a million altogether including grounds, etc.

Fourth case, an owner requested me to lay out the plans, before he started to build. I estimated fifteen thousand dollars, but the architect interfered to specify what I regarded as very undesirable fixtures. Finally I said to him that as I was responsible for the lighting, I was going to do it my way. I mention these few things to show what conditions the wiring contractor has to meet. Efficiency is seldom considered. Always the cost. Do as little as possible and let it go it that.

Fifth illustration, a department store owner said "Cut down your estimate two thousand dollars. I did so. After the store was finished, "Why didn't you give me better lighting " "I did but you cut it down." "You should not have permitted me to do so. You knew what I needed and should have made me do it." "

Mr. Luckiesh in his introduction had emphasized the necessity for selling lighting "effects" rather than fixtures. One of the members related how he and his partner had put on the market a lighting fixture consisting "of a simple metal ring with one light inside of it and a glass bottom. What we set out to provide was a pleasing lighting effect. We were so sincere in our planning to produce pleasing lighting effects that some people thought we did not care at all what the thing looked like that was to produce this effect. We did care that it should be practical to distribute this thing all over the country. We tried to make it easy for everybody to have, and for all of the distributing agents to be interested in as a commercial proposition. But what we were working toward all the time was that we should be able to make something to produce a better lighting effect, and which everyone could take and dress up as he pleased, and have color effects and shades of any kind that he liked. If he wanted to change the tint of the light, he could put a silk cover over the bottom.

Now things of this kind are teaching the dealers to sell lighting effects. To make that point clear, I should point out what we are doing to teach the dealer who otherwise would hang the lighting unit up in the midst of a lot of fixtures where it might as well be a mouse-trap. To make sure that the dealer presents the lighting effect properly to the public, we have had portable booths built, about eight or nine feet square, and are selling these booths to the dealers with instructions how to use them to illustrate lighting effects. The dealer puts only one unit in the booth, trims it up, and shows the lighting effect. You can make the unit look like anything you please, but the thing that is always demonstrated is the lighting effect.

The only thing wrong with this educational effort from Mr. Luckiesh's standpoint is that this lighting unit hangs from the ceiling. This is a matter of opinion, but we have got to take the country as we find it. The ceiling outlets are there, and if we are going to sell these effects we must sell them for the lighting outlets that exist.

Many members spoke of a point made by Mr. Luckiesh that a lighting installation in the home should have as much mobility as possible. For this reason ceiling outlets were not favored. Base plugs for floor and table lamps admitted of far greater variety. One of the members spoke of the air of coziness given to a room by a portable lamp and added "I have in mind a room of about 16 x 40 which was used by three people. With ceiling lights turned on, we were lost in the place. If we wanted to play cards in the corner we used a wall bracket and portable standard. One other interesting point for convenience, all of the wall switches instead of being inside the room were outside the room and on the same side of the door as the door knob. If you went into the bathroom, you turned on the light before you went in. This scheme worked out very satisfactorily.

Future Transportation Possibilities of the Motor Bus

It has been pointed out that motor bus operation is a comparatively new art. The possibilities of improvements are practically unlimited. This applies to design for greater comfort and convenience as well as to economy of operation. The bus requires a minimum investment in garage and repair facilities, and its low unit cost is a powerful argument in favor of its adoption. Unquestionably if a motor bus service is to realize its possibilities of financial success it must be backed up not only by ample resources but it must also develop a highly specialized organization. The engineering force and the management must have specialized experience, for the motor bus traffic demands are distinctly special.

Employees must be trained in a branch of motor vehicle operation with many distinct and unique peculiarities, for which the operation of neither the automobile nor any form of transportation affords suitable experience. One of the chief differences between the bus and other forms of transportation is the matter of flexibility. As a matter of fact we prefer to train men for drivers who have never had automobile driving experience. Furthermore, we find that railroad operatives, while they possess useful knowledge, must forget so much that on the whole it is more satisfactory to employ men without this experience.

Put in Hands of One Company

In my opinion the wisest policy, both from a financial standpoint and the service results to the city, is to entrust a single, well organized and equipped company, possessing ample resources, with the development of a unified motor bus service. Parceling out streets to two or more companies will never provide the Pullman car service which the true motor bus can give. The actual result of any form of competition must be multiplied fares and no transfers. With a unified system there can be no harmful monopoly, for the fare should be determined by the authorities and the company should be under public regulation, but so-called competition from a public utilities standpoint means bad service and financial failure. Cities cannot be prosperous without efficient utilities and utilities cannot be efficient without prosperity.

No satisfactory motor bus service can be given with seats for all on the basis of the 5-cent fare. It costs the Fifth Avenue Coach Company about 8½ cents for each passenger carried. A large proportion of our daily mileage is operated at a loss. Checks show us exactly where these losses occur, but we do not try to avoid them, as we are satisfied that by careful management on the whole a profit can be made and we should lose if we cut service to suit local conditions.

Success Depends Upon Goodwill of Public

We know our success depends on the goodwill of the public and it has always been our aim to give in exchange for our earnings an equivalent measure of helpful service.

Unquestionably in the large centers it is desirable that the workers should be able to get away from the busy centers of industry and into the more wholesome surroundings of outlying districts and everything should be done by city authorities to encourage this. Nothing is of more importance in this respect than providing expeditious, healthy, comfortable and easy means of public conveyance to and from these districts, for of course the development of the outlying districts raises values, so that the city will in this way obtain increased income from taxation.

Clearly, where car tracks do not already exist, the most careful thought should be given before they are installed. Quite apart from this, from a public as well as an operating point of view, there can be no question as to the possibility of using buses for (a) extending the service of existing car lines by bus system into the outlying districts through the introduction of transfer privileges between the two, (b) extending service, the condition of the streets permitting, into the outlying districts without transfer service between buses and cars and without transfer disturbing the present local business or business logical to the existing car lines, by permitting the buses to operate beyond the present outlying terminus of street cars and by diverting the buses to other parallel routes after reaching such outlying terminus.

Buses Cannot Properly Handle Peak Loads

In my judgment, no kind of bus designed up to the present is capable of properly handling peak loads. In my opinion the theory that the car systems in any of the larger cities can be supplanted by any standard size of bus now obtainable is absurd and not worth any serious discussion. No man with any elementary transportation knowledge would back such a statement. The bus is not more economical than the trolley car on the basis of cost per passenger carried, which is the only real basis. Obviously it is useless to compare the cost per mile of two vehicles with such vastly different seating capacity.

It should be borne in mind that the financial success of the Fifth Avenue Coach Company is largely due to the 10-cent fare. On a 5-cent basis its development would have been absolutely out of the question. The extra fare is willingly paid by the public to the bus company because of the greater ease and convenience of bus travel.

The policy of the Fifth Avenue Coach Company may be summed up in two words—"service and courtesy." From an outside viewpoint we try to give every member of our organization a square deal in all the word implies. With us the word justice is not merely an empty phrase. The "right of appeal" guarantees this. The doors of the executive offices are always open and the heads of the departments as well as the rank and file have free access at all times. Our staff officers are carefully trained and are taken into our confidence where matters of policy are involved and their views are eagerly sought. Our working conditions are just as good as we know how to make them. The net result is that labor troubles are conspicuous by their absence and practically every member of our staff has worked his way up from the ranks. Our organization is not a one-man proposition in any sense of the word, as each man is willing and anxious to do more than is expected of him and to subordinate his personal interest. We all believe in the theory and practice of teamwork, so it naturally follows that the operation of our business is extraordinarily free from petty jealousies and other forms of industrial unrest. We are extremely proud of our equipment and organization, with its personnel that knows not the word "failure." There is nothing at present to indicate any change in the future.

Motor Buses Supplement Electric Railway

A fleet of six motor buses and four trailers is being used by the Okmulgee (Okla.) Traction Company to supplement its regular railway service. Regular schedules are being maintained over two through routes which reach into all four parts of the city. Fifteen-minute service is maintained. The buses are operated on paved streets only, with the exception of special service furnished to the ball park when regular games are being played. Each of the routes reaches from 1½ miles to 2 miles from the center of the city.

For this service Oldsmobile trucks are being used. The cars are equipped with special bodies. The trailers are also equipped with specially designed bodies. The motor buses are of the one-man, pay-as-you-enter type with the entrance at the front. They are equipped with electric bells, lights and heaters. The trailers are entered from the side. The motor buses have pneumatic tires, while the trailers have solid tires. The car and trailer combined seat forty-two persons. Their capacity in rush hours, however, is sixty persons. The fare is 10 cents cash, with three fares for 25 cents, and free transfers are given between routes. School children and school teachers are carried on special tickets for 5 cents each during the months schools are in session.

The Okmulgee Traction Company is still operating the full complement of electric cars, but it is said to be the intention of the company to abandon the railway, tear up the tracks and substitute a complete motor service if the present experiment with the buses proves successful.

Okmulgee is the county seat of one of the large agricultural and cattle growing counties of Oklahoma. It is also the center of a rich oil, coal and natural gas field, to which industries are being attracted by the enormous supply of all kinds of fuel which is available here. The gasoline with which the traction company's motor cars are driven is a product of one of the five big oil refineries located at Okmulgee

---

Mr. N. C. Mills, of the Montreal Armature Works, Montreal, is on a business trip to the Dryden Pulp and Paper Company, Dryden, Ont.

The Contractor-Dealer

Some Pointers of Value in Sales Promotion Work—Indifference a Problem to Handle—Window Display Important—Have Special Display for Lamp Shades—Work of Sales Promotion Branch Essentially one of Education

The C. G. E. Sales Promotion Section has now been in existence fourteen months and everything points to the fact that it has justified its existence," said Mr. F. C. Medland, who is in charge of the sales promotion work for the C. G. E., when interviewed. "During that period quite a large number of contractor-dealers in various towns and cities have been visited, and a window display put in here, suggestions for changes in store layout there, and, wherever possible, manufacturer's helps have been introduced as an aid to display. Throughout there has been an effort to place experience at the service of the contractor-dealer. Don't make any mistake, time and effort spent in aiding and advising customers is never wasted."

"As a proof that this class of service is really bringing results a story can be told of a young man who shortly after starting in business was so delighted with the results from a window which had been dressed for him that he offered a gift to the service man as a token of his appreciation, and while, of course, it was refused, it was gratifying and well worth knowing that this free service we are offering is meeting with such marked success.

Well Received From First

"From the first we have been well received by every dealer visited, and our experience is that at the lowest estimate 75 per cent. of the dealers have followed out suggestions offered to them and not only continued to do so but made further developments along the same line The truth is, most of them need only to be guided along right lines to become keen exponents of good window and store display.

"It must be remembered that there are a large number of contractor-dealers who have had little or no experience in salesmanship or store management. Consequently they open a store at a great disadvantage, especially if competing with some who have had years of experience. These especially are the men our department seeks to help and they are the ones most eager to benefit by it.

"The really difficult person to deal with is, the one who is indifferent to the value of attractiveness as a means of increasing sales. If such a dealer was the only one selling electrical merchandise in his town, it would not matter so much from a pecuniary standpoint, because people would have to patronize his store, unless they waited for an opportunity to visit a store in a neighboring town. But once there are others to make competition he must either develop the display method or suffer loss of sales to the up-to-date dealer.

"There are others who make the excuse that they are too busy and cannot afford the time to dress windows and keep their store clean and neat. That is, of course, a poor excuse and is either the result of laziness or of ignorance. If the former they can rarely be made to change their attitude; if the latter, then our department is of help by demonstrating that the average small window can be emptied, dusted and trimmed under an hour, unless a special display is required, in which case another half hour may be taken up. Very few stores are so continually busy that they cannot afford an hour once or twice a week, especially when it means increased sales. As for the store interior, a few minutes every day spent in rearranging is all that is necessary.

The Window

"One writer recently stated that for the contractor-dealer no method of advertising is more important or brings greater results than the window display, and our experience has taught us that this is true.

"The big mistake made by most dealers is that of overcrowding the window. Mixing the various classes of goods is also another. It is quite true that everything kept in stock should be displayed in a window, but not at the same time. Supplies such as fuse plugs and sockets should never be mixed with appliances because the value of a window display is in its suggestiveness, and the suggestiveness is lost if the window contains articles which have no direct bearing to each other. In small stores it is not always possible to make a display of, say, table appliances alone because the stock carried is not large enough to make it possible, but at least the mixing of supplies and appliances can be avoided.

"As regards changing display, the dealer with a small store would get better results from changing his window every three days. The large store is expected to keep a stock of every kind of electrical merchandise, but the small dealer is not always in the position to do so. Some people are shy of entering a store to ask for information especially if they are not ready to buy. Consequently when a dealer changes his window often they know exactly what he is stocking and register it in their minds for future use. Then, too, the dealer with a large store can afford to adopt almost every means of advertising while his smaller competitor has only too often to depend solely upon his window displays. One other point suggested by the often changed window, is that the dealer is alive and alert to trade conditions, and also that he is persevering, keen, ready to oblige, anxious to please and willing to serve. It is an appeal that cannot be resisted. People get into the habit of passing such a store whenever in the neighborhood, just to see his latest display. This does not mean that the large stores should not change their window display often, for even in their case a change once every week is the best course.

Suggestions for Display Window

"Our suggestion for the best kind of display window would be: a flat, polished, hardwood floor and a background to the ceiling but not of glass. Closed-in windows are more easily kept clean, and the goods on display, especially nickleware, keep in as good condition as in a showcase. Then, too, it is more easily dressed. The usual arrangement against this class of window is that it robs the store of light, but when it is remembered that an electric store is usually lit up all day by the fixtures on display, the question of light need not be considered.

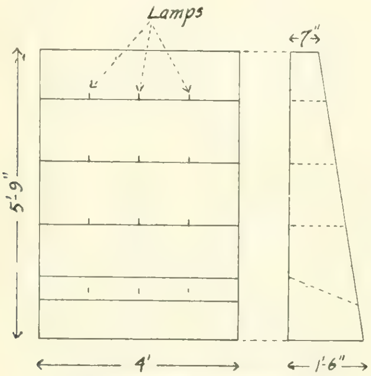
"The use of pedestals 12, 18, and 24 inches high is a wonderful aid to window display—none better. They particularly help a dealer to avoid overcrowding a window by giving the appearance of bulk without actually being bulky.

"Whenever we dress a window for a dealer we talk to him, giving reasons for displaying the goods in the way adopted at the time, and explaining what we believe to be the principles of appeal. If he should employ a clerk we try to do the same for him, and at the same time encourage him to ask questions. Only once have our suggestions been unwelcome and that was from a clerk who had had previous experience, but would persist in crowding everything into the window that he could find for that purpose. A man of that type would never make a window dresser if he lived to the age of Methusalah.

The Store Interior

"A neat attractive store interior is next in importance to the window display. The window attracts the prospects, the interior display will often clinch the sale.

"One of the biggest mistakes a dealer can make is to have his repair bench in the store. It suggests an indifference to the customer's likes and dislikes. Empty boxes in corners, wire, paper and odds and ends scattered about the store has the same effect. The average customer is sensitive to anything in the way of a want of consideration for his feelings, so that cleanliness and neatness are the two fundamental principles of store attractiveness. Moreover, it is necessary to be more careful of the arrangement of small supplies than of appliances, for they do not lend themselves readily to orderliness, nor to good display.



Set of shelves for glassware

Layout for Small Store

"If we were asked to suggest a layout for a small store we would advise the dealer not to have his business desk in the store if at all possible to place it elsewhere, but, in its place a small table with pen, ink, paper and telephone, for the use of customers. To make shopping less tiring there should be at least two chairs provided for customers. Undoubtedly the silent salesman is the best means for displaying nickleware for not only do they add to the attractiveness of a store but they preserve the goods, save extra work—a case is easier to clean than several appliances—and gives the customer a better opportunity for examination and contrast. A small counter is really necessary when handling small supplies, but it should be relegated to the back of the store to be as inconspicuous as possible. It should be neatly made and painted or varnished to match the rest of the store. A few shelves, but not many, for supplies in cartons having attractive colored labels, also in the rear of the store. Other supplies are better stocked under the counter or in cupboards. For lamp shades a set of shelves similar to the accompanying sketch are the most satisfactory. It will be noted that each shelf is narrower than the one immediately underneath it. This enables the dealer to grade the various sizes of shades without being tempted to crowd the shelves. The bottom shelf is placed on the bias to make possible a better display of the larger shades. Every shelf should be wired with sockets fixed to the top side. This enables the dealer to illuminate the shades, and at the same time change them around, when requested to do so by the customer, without having to detach them as in the case of a hanging display. For portable lamps a table is by far the best means of display.

Start Ceiling Display From Centre of Store

"We are convinced that many a store interior is spoilt by the method of crowding the ceiling with fixtures. Experience has taught us that the best effect is gained when the display of ceiling fixtures begins about the centre of the store and is extended to the rear. This makes it unnecessary for the customer to stand in an uncomfortable position with head craned back. Thus they are not tempted to chose hurriedly and go away not quite satisfied. The boards to which the fixtures are attached give a better effect if made of hardwood and polished. If this is too expensive softwood can be used and painted and grained. Wall brackets displayed on individual panels of the diamond shape type, covered with velours and with a beaded edge give by far the best effect. It is quite as simple to illuminate these as it is the long board containing a number of bracket lamps.

"It is needless to say that a carpet on the floor, however cheap, adds a final touch to effectiveness, besides being useful for vacuum cleaner demonstrations.

"The work of the sales promotion department is essentially one of education. It is free and is carried out by experts. Many other firms besides electrical merchandisers have realized its value and have adopted a similar scheme. The future will see more of it and as the retailers come to appreciate better the advantages of such systems there will be a greater demand for such education and a further development of the scheme.

There is No Holding Back the Vacuum Cleaner

The vacuum cleaner is fast becoming a staple article. The tremendous increase in sales during the past decade has justified the faith of those pioneers who years ago sought to give to the housewife an article that would make housecleaning, if not a pleasure, at least a pleasant task.

It had its first conception in the form of a large clumsy apparatus carried around on a truck and driven by an oil engine. This cleaner was operated by two men. A regular itineracy was mapped out and the machine taken from building to building, and house to house during cleaning periods. Since that time it has gradually evolved to the present light, neat, easily handled small electric cleaner which is finding its way into every home.

Tremendous Growth

Some idea can be gained as to the tremendous growth of sales of the cleaner from some of the statements made by responsible business men. One firm commenced selling the vacuum cleaner in Canada about twelve years ago. At that time they were turning out a machine with a 7½ inch nozzle. The number sold that year was about 120. The next machine had a 9 inch nozzle and the present machine measures 13½ inches. The sales last year had grown to about 7000. The first few years was a slow growth, but in late years the trade has developed rapidly.

In the case of another firm, who a little over two years ago undertook the Canadian agency for an American made machine, their sales averaged approximately, the first year, 15 each month. Last year the sales numbered 3500. Again a third firm estimates that they have from 12 to 14 thousand cleaners in Toronto homes alone and this is a Canadian made machine. As regards the retail stores the number of sales per month range from one to several hundred. A Detroit dealer regularly averages from 700 to 1000 per month and has reached 1200. Every firm tells the same story—a rapidly increasing demand for the machine which has revolutionized housecleaning. The unfortunate thing is that, owing to trade conditions it is a demand difficult at times to meet.

The demand upon the manufacturers is so great that one firm which also manufactures electric washing machines has had to leave 10,000 washers unfinished and put all the staff on cleaners. This same firm, when held up by transport difficulties, had their travellers take cleaners with them up to the extent of the weight allowed as personal baggage. In addition to this cars and trucks were commissioned to deliver orders as far as 190 miles distant from the factory, in order not to delay delivery.

Sales Methods

The question of sales methods, so far as vacuum cleaners are concerned, is apparently the will of the salesmanager of each branch. Occasionally, in certain details, the manufacturers will make a rule to be carried out by all their branches, as in the case of one firm who have adopted the policy of no house to house canvassing. This firm does very big advertising, makes extensive use of the telephone, pays immediate attention to enquiries from prospective buyers for which purpose they have salesmen always on hand to take machines to the homes of such enquirers for a demonstration. The machines are left for five days' trial and their claim is that they have very few returned. Their justification for this system is that as far as they can learn their sales compare favorably with those of other firms. They also claim that it practically eliminates any danger of their machines being used for a clean up by unscrupulous persons who have no intention of buying. They consider that because their customers are making enquiries on their own initiative they are serious in their intention to buy.

For the most part, though, the canvassing method is the one adopted by vacuum cleaner dealers. There is much in its favor if the right kind of salesmen are sent round canvassing. Men of neat appearance and courteous manners, and who never make themselves a nuisance by becoming too persistent are the only type for this most difficult method of selling. Personality counts every time in salesmanship.

Question of Free Trial

The system of leaving a cleaner for a week's trial, or more, is condemned by some as encouraging the cleaning up method. It has been noted that some women make a practice of trying every machine on the market during cleaning up time and then refusing to purchase. Such people have even been known to repeat this year after year—sometimes with the same firm.

Another objection to long trials is that if some unpreventable thing should cause the machine to get out of order, very possibly from the want of knowledge on the part of the lady using the machine, it might lose the sale, whereas if the same thing occurred after the sale was made they would think nothing about it and simply phone the dealer to call for it for repair. Such little things cannot be avoided and are not the result of poor material or manufacture, but they have a bad effect upon the prospective purchaser. Then too, to put a machine in a home for trial means keeping several machines for this special purpose.

Financing a Problem

The big problem as far as the small dealer is concerned is the question of financing the installment plan business. The greater number of machines are sold on the weekly payment plan and to carry a large number of such customers needs a big capital, which many of the dealers do not possess. Several of the large jobbing houses are working out schemes whereby they can help finance the dealer. If such plans are really workable it will mean a big boost for the cleaner trade—indeed for all appliances—besides being a boon for the dealer himself.

There is no doubt that the vacuum cleaner like all other electrical appliances is its own best advertiser. One dealer estimates that every machine he sells brings him, on an average, three more customers. This suggests another important point and that is: a firm able to make a statement of that kind must be supplying an article which is living up to its reputation. As almost every firm has a similar statement to make it means that no dealer need fear to add vacuum cleaners to his stock because they have reached a state of perfection which ensures confidence.

Enthusiasm and Pep the Dealer's Greatest Asset—Don't Become Mechanical—Cultivate the "Want to Sell" Spirit

Talk about 'enthusiasm and pep,' some business men, especially salesmanagers, fairly ooze it. It is impossible to come in contact with them without realizing that the task of increasing sales is the big thing in their lives. They live for it, work for it, think for it, sweat for it, and they get results. They are men of vision, they think in big numbers, their visions are for the future great development of their business. The interest they put into the present has for its aim the spreading over a wider area the merchandise they are handling.

When the most successful of these men are asked what they consider to be the secret of their success as salesmen they say "selling the service" and by that they mean that before trying to sell a washer, for instance, they first sell what a washer will do. But the great success of their 'pep' is something more than this, it is selling the washer first to themselves. They first convince themselves that the article is all that it is claimed to be. There are few men who can become enthusiastic over a thing they do not believe in and which they know to be unreliable. Consequently, satisfied that they are handling something that is of real value they can speak convincingly. One salesmanager recently stated the attitude of the average man in a similar position to himself, when he said—speaking of vacuum cleaners—"I think every machine on the market is good, but I think ours is better than any of the others." 'I think ours better,' that is the point and unless a dealer can get the same perspective he won't do very much with his business.

It is a mistake to think that because the goods stocked are inanimate they can be handled mechanically. Such an attitude kills pep at once. There is only one sure method of avoiding this and that is to get to know the goods, appreciate them, forget they are mechanical and get a little of the spirit shown by some of the antique dealers. To them many of the articles they handle are almost human. In this spirit it is possible to work up a real enthusiasm and to speak with conviction and, what is more, interestingly. A customer readily appreciates this kind of spirit and while a sale may not be made at the time it is good advertising for future sales.

Enthusiasm and Pep Infectious

Enthusiasm and pep are infectious. A good keen wide awake discussion with a live wire is invigorating and many a man feeling down and out has taken a fresh grip of things and made a success of life as the result of coming into contact with a man who fairly radiated these qualities.

Some men are born with this vitalizing energy, but it can be cultivated by the most ardent pessimist if he is so minded. It will be hard work but good discipline, and will have a stiffening influence later on that will be of untold value when face to face with some of the big problems that come to every business man.

One danger to be avoided is over enthusiasm. It is easy to become overbalanced and to get the very opposite results expected. When dealing with a customer watch yourself and above all watch your customer as a cat watches a mouse. Pep and keenness may be 'Open Sesame' to the pocket book, but over enthusiasm may close it again.

The point in all this is that there is really no fundamental difference between the salesmanager of a big firm and a contractor-dealer, for the latter is salesmanager of his own business. If anything this gives the dealer an advantage, for while the salesmanager is working for a salary the dealer is working for himself. Every extra dollar brought into the business is a dollar into his own pocket. It is a great incentive to work. All the more reason then for pep and enthusiasm.' It is easy to fall into the idea that advertising means paying someone else to make known certain merchandise and where it can be obtained, but a hearty good-day, a vigorous businesslike air and a cheery courteous disposition is often as good advertising as half a page in a local newspaper.

The sum of the whole matter is that you can't make a person 'want to buy' unless you cultivate the 'want to sell' spirit.

Miniature Waterfall Utilized to Attract Crowd—A Little Effort Brings Big Results—Children Pass the News Around

It does sometimes seem as though the new entrants into the field of contractor-dealers show the most enthusiasm for creating methods of attracting the crowd.

Mr. G. E. Ginn of 449 Dovercourt Rd., Toronto, has been in business for about eight months. His store is just around the corner from a fairly good shopping street and consequently needs special methods of advertising to attract customers. Sometime ago this enterprising young dealer built a small waterfall in his window which drew crowds from the corner to gaze in at the novel display.

In the centre of the window he placed a 4 ft. x 2 ft. x 7 in. zinc tank. At one end of the tank he built a model hill of plaster of paris and stones, colored to look like rocks. At the base was fixed a water wheel and behind the wheel a light. Around the tank and over the edges so that none of the zinc was visible was banked up a quantity of sand. The whole formed a miniature lake. A length of hose pipe ran up to the top of the hill and from it a constant stream of water was kept flowing down to the water wheel. An outlet from the top of the tank took care of the overflow. In the tank was placed gold fish, shells and weeds. Several ferns around the hill gave added rural effect. In addition Mr. Ginn procured several toy frogs and alligators to give a further touch of realism. When the water flowed over the hill on to the wheel and the light was switched on, a rainbow effect was gained from the splashing drops.

It was found that the plaster of paris gradually wore away from the action of the water and Mr. Ginn suggests that concrete be used as a substitute. The remainder of the window space was utilized to display merchandise and this display was changed every other day. Increased sales proved that time and money spent in fixing up such a window had not been wasted. A crowd would gather around the window and people passing the street and seeing the crowd were attracted to the window out of curiosity, with the result that many became aware for the first time that there was an electrical store in the neighborhood The children were especially good advertisers for they would gaze into the window in great numbers and then talk about what they had seen, to their parents and friends. From the time the display was first shown to the public until the time it was removed there was hardly a minute, during shopping hours, that someone was not gazing into the window.

Electric Dishwashers at Last Coming into Their Own

Electric dishwashers have not been pushed to the fore as their utility should demand. Gradually, however, they are coming to their own and when dealers find time to push this machine along with the washing machine and vacuum cleaner it will probably become the most popular of the three.

Perhaps there is no part of the average housewife's duties which becomes so monotonous as the washing of dishes. Washing the clothes is a once-a-week job as a rule, while sweeping and cleaning is done at intervals, but dishwashing is a three-times-a-day task at least and continues day after day and month after month, never varying except that sometimes there are more to wash than usual. Yet right at hand the electrical merchandiser can, if he will but stock them, offer to her a means of doing this most monotonous task mechanically, in three minutes.

Dealers! think of this talking point: An hour's work done in three minutes. No dishes to wash, none to dry, all that is necessary, is to place the dishes in the racks provided for them, turn on the hot water and the power, and in three minutes remove the tray and leave all to dry by their own heat generated by the hot water. .

It has been suggested that unless scalding hot water is available the dishwasher is a failure, but according to every good housewife the best results are obtained by the use of medium hot water. For instance egg yolk, or flour will cake hard on a plate if scalding water is used. Scalding water is certainly the best for rincing.

Contractor-dealers would do well to consider seriously the addition to their stock of this valuable labor saver

The London Hydro is noted for its fine window displays and demonstrations—this is another of them.

Sales Demonstrations by Live Dealers

The Thor Electric Shop, 413 Yonge St., Toronto, Ont., representatives for the Thor products of the Hurley Machine Co. are great believers in practical demonstrations as the best means of advertising their merchandise. They make a rule to put on, at intervals, campaigns for many of their customers. The two cuts shown herewith give some idea of their methods. The one showing an actual demonstration was carried out in front of the store of Mr. W. G. Edge, Ottawa, and the immediate results were very good Actual washing and ironing was done for the benefit of interested spectators, and the latter kept the demonstrators busy answering pertinent enquiries concerning the time, labor and money saving qualities of electric appliances.

The other cut shows the London Hydro-electric store which also had a Thor week.

Before sending their demonstrators to put on the actual campaign the Thor company obtain a list of prospects from the dealer at whose store the campaign is to be staged. To each of these prospects is sent a personal letter telling them about the campaign and the possibilities of electrical appliances, especially the washer, dish washing machine and vacuum cleaner, in the home.

After the demonstration, those to whom the letters were sent, and all who have made enquiries during the campaign are followed up either by phoning, letter or personal calls as the case warrants.

As the result of this vigorous going after business the number of sales of Thor products is steadily increasing.

Two things worth remembering are: first, every individual of a crowd watching such demonstration is a prospective customer, and second, the whole trade benefits from such publicity.

A splendid demonstration of washing machines but— it's in a plumbing and hardware store.
Mr. M. K. Pike, sales manager Northern Electric Co., recently said, "It is high time that merchandising of electrical goods be lifted out of the position of being mere side-lines for hardware, drug and jewelry stores."
How long are you, Mr. Electrical Dealer, going to sit by and watch this business grabbed from under your very nose?

The Illustrated Catalogue a Good Salesman

Mail order firms are a Godsend to the people living in sparsely settled places, and the retailer is quick to appreciate this. But the question that he is constantly asking himself is: Why do people living in the town or city, who have every opportunity to visit stores and examine the article they are buying, prefer to buy from a catalogue and send their orders to some distant city?

One reason is that they like to sit down quietly in their own home and study the illustrated catalogues, making a choice at their leisure. In some homes the attractive departmental store catalogue is treasured almost as much as the Bible.

Very often it is picked up with the sole purpose of helping to while away an hour or so, with no thought, on the part of the reader, of making a purchase. Yet undoubtedly many sales have been made this way. Between its covers are hundreds of suggestions, just silent salesmen, but efficient all the same.

The contractor-dealer may not be able to afford a very elaborate catalogue, but it is better to have a small one well illustrated, than to have a large one with no illustrations.

The cuts, of course, are the great expense. The manufacturers, however, are only too willing to lend electros for advertising purposes so that a dealer willing to use part of his appropriation for advertising, along with these electros can if he is so inclined get out a very neat little trade list at no great expense to himself. These sent out to his customers and prospects at least twice a year would in a very short time more than repay him for his outlay. The main point is to let the people know that he is alive and it is usually necessary to spend money to let them know. It will all come back and more with it.

The Danger of Overbuying

A recent correspondent in a trades journal writes very pointedly about the evil of overbuying. He cited the case of a dealer whose business was nearly closed down by his creditors. The only thing that prevented the creditors from taking such a drastic step was, that they realized they were partly to blame for his position. Knowing his weakness of buying more than he could handle, they had not tried to warn him of the foolishness of such a course. After a long discussion they decided to warn him of this weakness and give him another chance to make good. Like a wise man he took their advice in the right spirit and eventually turned his business into a success.

In this case everything turned out well for both dealer and creditors, but only the belated realization of the true state of affairs saved a good merchandiser—except for one weakness—from going to the wall and a number of business men from losing money, to say nothing of possible similar repetitions in the future.

Such a state of affairs can only result from a combination of two evils; a lack of knowledge in the principles of buying on the part of dealers, and failure on the part of manufacturers and jobbers to obtain correct data as to the scope of their customers. Possibly too much faith is placed in the traveller. Many contractor-dealers have had little experience in salesmanship or store management and need to be guided by the more experienced manufacturers, jobbers, or travellers. The traveller's temptation is perhaps to make sales even against his own better judgment, especially if he is working on commission. Such methods may bring an immediate increased return, but are not calculated to bring larger sales in the long run. The dealer depends a great deal upon the traveller's wider knowledge of the market to guide him in buying, so that if the traveller considers himself only, the result is apt to be disastrous.

What is the remedy? A closer co-operation between manufacturer and dealer or between jobber and dealer; a mutual helpfulness. Large wholesale houses employ a credit man to keep the dealers up to the mark in their payments; why not an expert in market conditions to advise customers when purchasing?

Mr. Contractor-Dealer, Add These Ten Reminders to Your Business Bible

1. Be willing to place your goods along side those of your competitors. If the article you handle will not bear the comparison, get rid of it.

2. Keep in touch with customers for months after selling them. They like to have you interested in the goods they have bought from you. It gives them confidence in your service because you show confidence in the goods you handle.

3. A person once sold to, is always a prospect for other sales.

4. "If you have no competitors, compete with imaginary ones," says one experienced writer. This will encourage you to "clean up house, survey lists, go after new customers, study new points about your goods, change this or that way of doing things, look to personal appearance, polish 'approach,' put pep into your handclasp, and go out to do the selling."

5. Study when to talk and when to listen.

6. A good repair department, according to one successful dealer in appliances, "pays for itself ninety times over."

7. A purchaser buys an electric appliance for what it can do and not for its motor, frame and mechanism.

8. A sum invested in service can be regarded as a reinvestment in the business.

9. Two and a half per cent. of a dealer's annual outlay is suggested as a fair proportion for advertising.

10. Never sell an article which you would not put in your home, that is, in regard to quality.

Lincoln Electric in New Quarters

The Lincoln Electric Company of Canada, Limited, have recently moved both their office and works and now have both located together at 136 John St., Toronto, in a commodious three storey building. The top floor of this building will be entirely given over to the winding of new motors and motor repair work. The second floor is devoted to offices while electric welding operations and the repairing of large motors will occupy the ground floor. As the company is now assembling and winding Lincoln motors in Canada, buying their copper and other materials here, they have recently joined up with the Canadian Manufacturers' Association. With their present staff they have a capacity to wind from ten to twelve motors a week.

Hurley Machine Co. Open Up Factory in Toronto

The Hurley Machine Co., of Chicago and Toronto, have recently commenced manufacturing their dishwasher in Canada. They have taken over part of the Canadian Rumley building at 43 Able St., Toronto. Later on they intend to manufacture their Thor washing machine at the same plant. At present they are held back by the shortage of motors.

A feature of the Canadian National Exhibition this year will be a building entirely given over to the electrical industry. The exhibit will be entirely representative and will include a number of interesting manufacturing processes.

Why Not Give a Cookery Book?

Every housewife is 'tickled to death' to get a new recipe for cooking. Hubby often gets fed up with the same old dishes and is constantly hinting for a change. The old cookery book has quit giving new ideas and wifey's originality has run dry. Here's where the wide-awake contractor-dealer steps in, by getting up a small tasteful cookery book, with special reference to dishes which can be best cooked electrically.

There is no call for an expensive book because most housewives think far more of the recipes the book contains, than as to whether the book is well bound or not. Indeed a book with an expensive binding is more likely to be relegated to the bookshelf and never looked at.

The recipes could be obtained by such a scheme as, say, offering a prize for the best recipe and with a condition attached that all recipes sent in are at the dealer's disposal. In this way quite a large collection could be obtained.

Hoover District Managers' Conference

The district manager of the Hoover Suction Sweeper Company of Canada, Limited, located in Ontario and Quebec, held a conference at the company's factory at Hamilton on Thursday July 8th. The meeting was attended by the following district managers: H. M. Potticary, Montreal, Que.; J. Skelton, Toronto, Ont,; Elmore Philpott, Hamilton, Ont.; A. P. Reed, Ottawa, Ont.; Geo. T. White, Windsor, Ont.

The company has decided to hold a Sales Convention on Friday, August 20th, which will be attended by all of their salesmen in Ontario and in the city of Montreal. The company have announced to their dealers that they have added "The Saturday Evening Post' to the present large list of magazines published in the United States and Canada, containing full-page Hoover advertisements. These advertisements will appear each week in The Saturday Evening Post, commencing with August 21, 1920.

Photographs Make Good Advertising Medium

Methods of advertising have no limits. Keen, alert business men are always on the look-out for some new scheme by which they can keep the public informed as to what is going on. Take note of the following scheme which was adopted by an enthusiastic contractor-dealer recently:

He had photographs taken of several of the best examples of well lighted homes, the wiring and installing of fixtures for which he had been responsible, also washing machines, vacuum cleaners. percolators, etc., at work in various homes. These he had enlarged and copies placed in his windows. In addition he had small copies pasted in an album and placed on a small table in the store. The former drew large crowds and the latter were useful to interest waiting customers.

How to Proportion Advertising Allotment

A representative advertising campaign for the sale of electrical appliances in a city of about 50,000 was estimated as follows, regarding the appropriation: Total amount set aside, $10,000; two local newspapers, $2,000 each; suburban or country papers in vicinity, $1,000; cuts, etc., $500; booklets on the use of electrical appliances, electrical gifts, etc., $1,500, mailing and postage of booklets, $1,500 stickers, fliers, stuffers, demonstrations, $1,000; residue, miscellaneous, $500.

Too Much Reading Matter Detracts from Value of Advertising

If any criticism can be made of the following advertisement taken from a Hamilton daily, it is that it was rather lost in the midst of many lines of other advertising matter pertaining to the same machine.

"**H** is for Homes that are kept spick and span,
O is for Only—there's only one plan
O is for Order—send yours in today,
V is for Vacuum—you'll find it will pay,
E is for Energy—saved by this aid, and
R for Rejoicing—that this choice you have made.
The whole is the name of—**An A-1 Machine.**

The Popular Electricians, 205 King St. E., Hamilton, were the advertisers.

Changes and Removals

Canadian Specialties Manufacturing & Supply Co. of 125 Queen St. E., Toronto, are giving up business.

The Ontario Electric Fixture Co. have moved from 649½ Queen St. W., Toronto, to 560 Queen St. W., Toronto.

The Eureka Vacuum Cleaner Co., have moved their Toronto headquarters from 8 Temperance St. to 377 Yonge St.

Geo. Eakins, electrical contractor, has moved his business from 1612 Queen St. W., Toronto, to 1535 Queen St. W.

The Consolidated Elec. Co. of 129 Queen St. E., Toronto, manufacturers of electric motors, will move shortly to their new factory at 230-2 King St. E., Toronto.

Personals

Mr. S. G. Peach, who has been secretary-treasurer of the Western General Electric Co. for the past two years, left recently for his home in England.

Mr. A. G. Rainnie, of Sackville, N. B., who was overseas nearly four years, first with the 145th Batt, C. E. F., afterwards transferring to the 2nd Division Canadian Field Artillery, has gone into the electrical contracting business, and will also supply fixtures, etc.

Mr. A. S. Edgar has been appointed supply manager of the Canadian General Electric Company, the position held by the late Mr. L. O. Horner. Mr. C. S. Barthe, former sales inspector, succeeds Mr. Edgar. Both gentlemen have been with the company for many years.

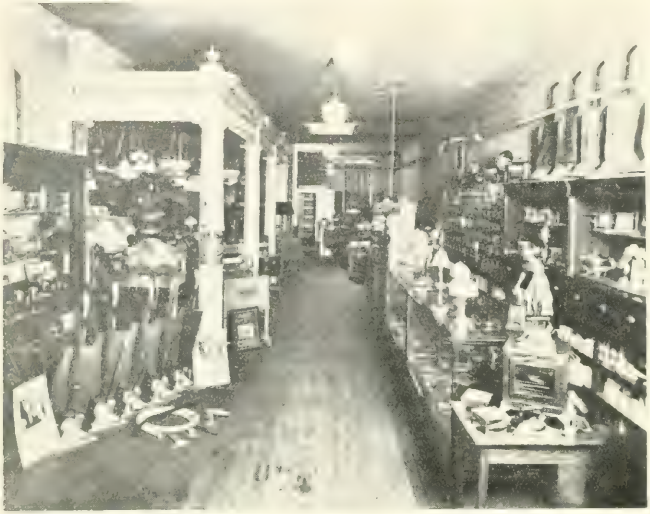
Mr. A. J. Tobin, the newly appointed superintendent of the Ottawa Electric Railway Co, was the recipient, recently, of a handsome humidor, suitably engraved and filled with cigars, as an expression of good will from the inspectors of that company. Mr. Tobin has been with the firm 23 years and has the distinction of being the only employee of the company to rise from conductor on the cars to that of superintendent.

Obituary

Mr. W. W. Wood, Brampton, Ont., manager of the North Western Telegraph Co, in that town, died recently at the age of 67.

Mr. P. E. A. Merrit, for fifteen years paymaster of the Canadian Westinghouse Co., Hamilton, Ont., died recently at his home in that city.

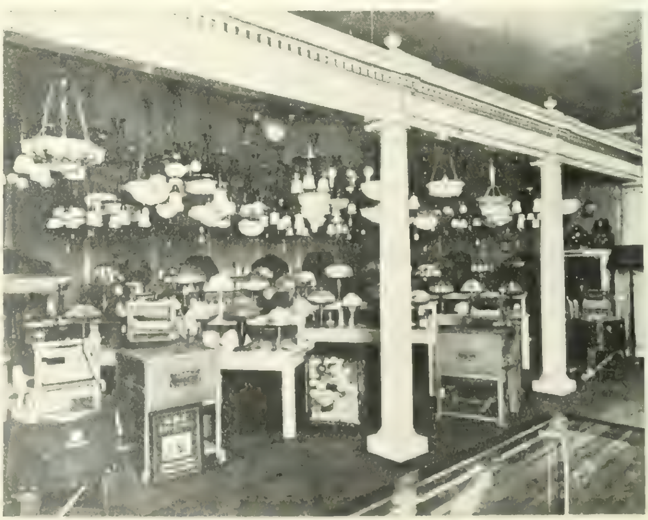
Mr. John Gilhooley, manager of the Regina branch of the Northern Electric Co., was drowned recently in the Lake of the Woods, Escanaba, Mich., while attending a summer convention.



General view of interior of store of Sun Electric Co., Regina Note that every inch of space is utilized to good purpose.

Another Fine Western Electric Store

The store of the Sun Electric Company of Regina, Sask., which is illustrated in the accompanying cuts, is an evidence of the excellence of the merchandising methods of Western electrical dealers. Our readers will remember the item in our June 15 issue describing the prize competition put on by this store which further indicates the methods used by this progressive company to attract business. As can be seen from the protographs the greatest care has been taken to make the display of goods attractive. At the same time they are in great variety and easily "get-at-able" for the customer who wishes to make an inspection of any particular article. The Sun Electric also have their front windows "on the sales staff."



A close-up view of the fixture, table lamp and washing machine display of the Sun Electric Company, Regina. Note that everything is neat and clean "as a new pin."

Manufacturers of New Soldering Iron, and Dealers in Amateur Wireless Sets

The Vimy Supply Co. electrical contractor-dealers and specialists in wireless sets for amateurs, have moved from 585 to 567 College St., Toronto. These are much larger premises than previously occupied by the firm and will give them space to manufacture their Vimy soldering iron, a cut of which appears herewith. The handle of this iron is made of wood, the tubing of nickle plated steel and the bit of iron copper tipped. The chief features are that the control switch is in the handle, the bit is adjustable and renewable, and the element also is renewable. The iron, which has been approved by the Ontario Hydro-electric Commission, is made in three sizes: .7 amps., 1.4 amps., 1.7 amps. The machine shop is in the rear of the store and the assembling room is over the store. At present most of the parts for the wireless sets are imported from the U. S. but in time they hope to manufacture them also. The manager, Mr. J. W. Askham, was in the R. A. F. wireless section for more than four years, a greater part of that time being spent in France He is an expert in wireless installations, and hopes to create a big demand for this fascinating hobby, especially among boys.

The Vimy Soldering Iron

New Electric Burner to Speed up Battery Repairs

The Pyrotip Electric Burner manufactured by the Canadian General Electric Co. is a piece of electrical apparatus used for tearing down and rebuilding lead plate batteries by means of intense concentrated heat. Its main features are: it is easily attached to standard light socket or receptacle with separable screw plug; flexible 10 ft. leads protected from acid, wear and dirt by heavy covering of high grade rubber; well balanced handle fits snugly into the hand; one secondary lead terminates in carbon holder and the other has a spring clip for ready attachment to part of battery to be worked on; intense heat created by specially shaped long life carbon.

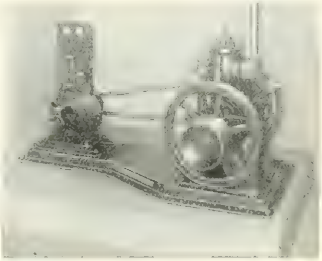
Electric burner for battery repairs

It is of strong compact construction and all live parts are heavily insulated.

Its advantages are. economy in cost of operation and time; no handling or charging tanks necessary; danger of explosions and fire eliminated; always instantly available; the entire outfit is portable; intense heat insures better work and it is always under perfect control.

Belt Driven Electric Farm Lighting Plant

Both electric and mechanical energy may be obtained from the belt driven farm lighting plant now being marketed by the Chambers Manufacturing Company of Butler, Pa. The 4 hp. engine has two pulleys—one for driving the electric generator and the other for furnishing mechanical power. The engine may be operated with gasoline, kerosene, crude oil or natural gas. The generator is a 40 volt, 1 kw. shunt-wound Westinghouse machine equipped with a sliding base to allow for proper feet adjustment. The unit is controlled by a Westinghouse panel, on which are mounted a voltmeter, rheostat, fused line switch, series field (starting) switch, and a reverse current relay. To start the unit the series field (starting) button, at the lower right side of the panel is pushed, causing the battery to operate the generator as a motor to crank the engine. To stop the unit, the switch at the lower left of the panel is pushed in, breaking the ignition circuit of the engine. The rheostat controls the battery voltage, and the double-pole fused-switch in the centre of the panel is used to connect the electric generating unit with the light and power line. The relay mounted on the rear of the panel automatically keeps the battery from discharging through the generator when the generator is not running. It also automatically connects the generator to the battery when the generator voltage is sufficiently high, to charge the battery. Both units are mounted on the same cast steel base. The 16 cell, 107 amp. hr. battery is made by the William Storage Battery Company and is of the glass jar lead type.


Compact farm outfit

An Electric Rivet Heater

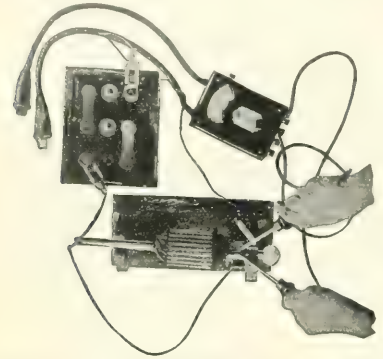
Electric rivet heaters were designed and perfected by American Car & Foundry Co., 165 Broadway, New York, during the past six years, to improve working conditions in its own shops. Daily use developed so many valuable features that several outsiders, who had seen the heaters in operation, asked that they be marketed. This was done, in 1919, and eleven standard Berwick electric rivet heaters, for various rivet sizes and capacity requirements, are now available. It is claimed that with this heater burning and scaling spoilage of rivets has been reduced to less than ½ of 1 per cent., effecting a saving of about 40 c. per 100 lb. of rivets heated. The heater consumes less than 20 kw. hours per 100 lb. of rivets heated. The heaters are furnished with from two to five electrodes, or more, according to the capacity required, for various sizes of rivets up to 1½ in. by 10 in. or larger. Capacity depends upon sizes of rivets and types of heaters, varying from 75 to 600 hot rivets per hour. Using less than maximum capacity does not increase the cost of heating, single rivets can be heated on a five-electrode heater with the same current consumption per rivet as though the heater were running at full capacity.

Hyrate Electro Trouble Detector

The Hyrate Electro Trouble Detector is a high grade portable electrical testing equipment, combining five instruments in one. It is designed for conveniently and rapidly locating any troubles in automobile electrical equipment.

The instrument is entirely self-contained, and includes all cables, contact clips, leads, prods, cadmium, etc., all assembled in one unit. There are no external shunts or complicated connections to be made.

The needle is at the center of the scale when at zero, and moves to either side so that it is impossible to injure the tester by reversal, as is possible with old type meters which must be connected with positive contact to the positive side of the electrical circuit. The instrument is as nearly proof against damage from misuse as it is possible to build such an outfit.


Manufactured by Service Station Supply Co., Detroit

With each tester a complete instruction book is furnished, and these instructions will enable any intelligent mechanic using the tester to quickly locate and eliminate any electrical trouble in any automobile, no matter what make or model. Service Station Supply Co., Detroit, are putting this instrument on the market.

Electrically Operated Advertising Sign

For displaying advertising cards in shop windows, a motor driven card display machine is being manufactured by the United Advertising and Sales Company of San Francisco, California. By this machine 24 cards of standard street car size are continuously rotating, individual cards sliding into view at definite intervals. These machines are of all metal construction and are attractive in appearance. Chains at both ends of the machine are driven by a Westinghouse type CA, 1/20 h.p., 110 volt, 1750 r.p.m. motor through a horizontal shaft, worm gear and belt.

Automatic Electric Sign

A Universal Electric Plug

A new connecting plug which fits all makes of irons, toasters, heat appliances, etc., has recently been put on the market. This new connector is called the "Halebro Konectall Plug." The clips, which are made of selected spring brass assures perfect point of contact on all terminals. The black composition parts are heat resisting and highly polished, while the spiral spring assures cord protection. The "Halebro Konectall Plug" is manufactured by Hale Brothers, St. Paul Street, Montreal.

Fits all makes of appliances

Still Another Battleship Propelled by Electricity

The electrically propelled United States battleship Tennessee, which went into commission on June 3 is claimed by the Electrical World to be the most powerful fighting vessel in the world today. She is 625 ft. long, has a beam of 98 ft. and displaces 32,500 tons. Her main battery consits of twelve 14-in. guns, and she is protected by a belt of armor 14 in. thick. Her main engines consist of two Westinghouse turbine-generators, rated at 15,000 kv.a. each, and each of the four propellers is driven by an 8,000 h.p. Westington motor. Her maximum speed with full power is 21 knots.

The Electric Supplies Co., have issued a bulletin, No. 166, describing Keystone Locomotive Headlight Equipment illustrated with colors.

Safety Apparatus

An attractive catalog, No. 12-A, is being distributed by the Canadian Krantz Electric & Mfg. Co., Ltd., describing Krantz safety apparatus and panelboard switches. This catalog contains 65 pages of well illustrated valuable information for the company or organization interested in adding greater safety factor to the operation of their plant. Greater safety means fewer accidents and fewer accidents greater production, so that in these days of high manufacturing costs, greater safety means efficiency and economy. The installation of safety apparatus should therefore be the prime consideration for every central station, every factory, every plant of whatever kind where electric power is utilized.

Persistency Can be Carried Too Far

It is not sufficient to sell an article, but it must be sold with conviction if the customer is to be satisfied.

Salesmen are often heard to remark that any fool can be an order taker but it takes a man to be a salesman. They explain that it is when a prospect has refused to buy, with a decided no!, that the real salesman sets to work to change that no to yes. This may be true to some extent, but should that customer go away with an article which he did not want, but which he allowed a persistent salesman to persuade him into buying, it were better that the sale had never been made.

A Negative Tribute To Advertising

One large firm of electrical appliance manufacturers have had to cut down on their advertising, because shortage of material and labor conditions have made it impossible for them to cope with their present demand. This is by no means uncommon and is a great tribute to the value of advertising as a means of increasing sales. Mr. Contractor-dealer if you aren't getting your fair share of business make a study of your advertising. Possibly you are not spending sufficient time and money on such an all important matter.

New Incorporations

The Belcarres Power & Light Co, Belcarres, Sask., has been incorporated with capital $15,000.

H. N. Fox & Co, Ltd., has been incorporated with headquarters at Leamington, Ont., and capital $20,000 to carry on business of dealers in electrical supplies.

St. Andrews Electric Light & Power Co., incorporated with headquarters at St. Andrews, N. B. Capital $9,900.

Instantaneous Electric Heater (Canada) Ltd, incorporated with headquarters at Toronto, Ont. Capital $250,000.

Electro Mechanical Advertising Ltd., incorporated with headquarters at Toronto. Capital $50,000. To manufacture and sell electrical signs and appliances of every kind.

Canadian Radio Corporation, incorporated with headquarters at Toronto, Ont. Capital $5,000,000. To carry on business of electrical engineers.

The Lorn Electric Company, a new firm, have opened offices at 1747 Lorne Street, Regina, Sask., carrying a full line of supplies for electrical work. Contracts have already been awarded the company by the Regina Development Syndicate and for work in the C. P. R. roundhouse.

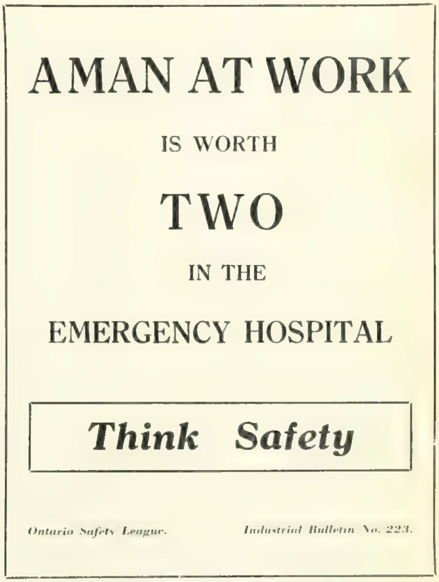
Messrs. MacDonald & Woods, electrical contractors, is a new firm started recently at 779 main St., Moncton, N. B. They are open to give prices on electrical work of any kind and specialize in car wiring and storage batteries, also A. C. and D. C. winding of any description. In addition they will stock fixtures and supplies.

Electric Railway Commission

The Board of Control of the city of Toronto have appointed a commission of three members to manage the street railway when it is taken over in 1921 from the Toronto Railway Company. The members are Mr. P. W. Ellis, Chairman of the Toronto Hydro Electric System and also Chairman of the Victoria Park Commission, Niagara Falls; Mr. George Wright, Toronto Hydro Commissioner and Mr. Fred Miller, of Roger Miller & Sons, contractors, whose splendid work during the war with British Forgings, Limited, has been widely recognized.

Motor Repairs and Rewinding at Wed Electric Co.

Last spring Mr. W. E. Denroche started business at 43 Simcoe St., Toronto, under the name Wed Electric Co. Mr. Denroche buys and sells motors and specializes in motor repairs, rewinding and installations. In addition the firm is open to contract for all classes of electrical work. For some years Mr. Denroche was in charge of the electrical plant of the Salada Tea Co., both at Montreal and at Boston. He has also been with the General Electric Co.



A MAN AT WORK

IS WORTH

TWO

IN THE

EMERGENCY HOSPITAL

Think Safety

Ontario Safety League. *Industrial Bulletin No. 223.*

Poster distributed by Ontario Safety League

"Electric Shop" in Truro, N. S.

Mr. E. W. Jeffrey recently opened an "Electric Shop" at Prince and Louise Streets, Truro, N. S., carrying an up-to-date stock of electric fixtures, washing machines, supplies, etc. Mr. E. W. Jeffrey was previously with the Canadian General Electric Co. Ltd., Halifax, N. S., for two years, and with the Northern Electric Co. Ltd., at Halifax, N. S., and Montreal, Que., eight years.

Which Kind Are You?

There are three kinds of salesmen: The man who d a thing, the one who wishes he had done it, and the one w promises to do it.

The Toronto Hydro-Electric System

The Ninth Annual Report of The Toronto Electric Commissioners, 1919

COMMISSIONERS' REPORT.

To His Worship the Mayor and the Members of the Council of the Corporation of the City of Toronto.

Gentlemen:—Your Commissioners beg to submit their Ninth Annual Report on the operations of the Toronto Hydro-Electric System for the year ended 31st December 1919, accompanied by the Revenue Account, Balance Sheet, and subsidiary statements. The Accounts have been audited by the Audit Department of the Corporation of the City of Toronto, whose certificate is appended thereto.

FINANCIAL POSITION AS AT 31ST DECEMBER 1919:

The operations for the year 1919 have resulted as follows:

The gross income amounted to the sum of	$2,504,758.31
The cost of electric current and the expenses of operation and management, including repairs and maintenance, absorbed the sum of	1,577,122.50
Leaving a surplus of income on operating account of	927,635.81
Interest, Depreciation, Exchange, Sinking Fund and Debenture retirals absorbed the sum of	923,484.49
Leaving a surplus of net income for the year of	$4,151.32

Had the enterprise been conducted as a commercial corporation with perpetual share capital the net earnings for the year would have been shown at the amount of $568,377.43, that being the sum of the interest payments, the sinking fund appropriations, the debenture retirals, and the net surplus. This would be the equivalent of a dividend at the rate of approximately 7% for the year on the average amount of capital invested.

The net funded debt at 31st December 1919, less sinking funds in the City Treasurer's hands amounted to the sum of $8,244,533.89, all of which will be promptly paid at maturity by the annual retirals of the serial debentures and by the operation of the sinking funds applicable to the long term debentures.

The total amount of the unfunded debt at the same date was $284,394.81 against liquid asset resources of $1,346,456.17. Of the latter $475,190.98 represented cash on hand and on deposit.

Surplus funds, representing profits after meeting all operating costs and exchange losses, had been accumulated at the same date to the amount of almost three million dollars as follows, viz:—

(1) A Reserve Fund for the replacement in the future of Buildings, Plant and General Equipment, as such wear out, of..		$1,635,701.20
(2) Reserve Funds for general contingencies, for loss on American exchange, and for contingent liabilities arising out of the Workmen's Compensation Act, of		157,125.54
(3) Reserve Funds held by the Provincial Hydro-Electric Commission on ac- [illegible]		[illegible]
(4) Sinking Funds held by the City Treasurer for the retiral at maturity of debentures, and interest thereon, of ..		910,100.61
(5) Serial debentures retired, thereby creating additional equity in underlying property, of		129,365.50
(6) Additional free surplus of		101,447.29
Total Reserves as per Balance Sheet.		$3,062,865.60
(7) Less:		
(a) The Reserve for Depreciation of leasehold property for which no value is held	$44,167.95	
(b) The Reserve for loss on American exchange which was an actual incurred liability at the end of 1919..	18,831.33	62,999.28
Net Reserves of the Nature of Surplus		$2,999,866.32

This striking result has been accomplished in eight years after operating on a scale of consumers' rates, which, while materially lower at the beginning than that of the System's principal competitor has been since substantially reduced—twice as to general rates and twice as to street lighting rates; after charging all repairs and maintenance expenditure against income; after paying on the whole a higher rate of interest on the Debenture Capital than was anticipated at the inception of the enterprise—interest that may be regarded as the equivalent of a reasonable dividend on the like capital of a like enterprise privately owned; after establishing voluntarily a generous scale of compensation for all employees and paying the still higher rates that by Conciliation Boards and otherwise have been added from time to time to the original voluntary scale; and after making liberal subscriptions to Patriotic objects during the War, and liberal grants to employees who went to the Front, and to their dependents. In this connection it is worthy of special note that no charge has been made against Capital Expenditure at any time that should have been met out of Income. These funds therefore represent the accumulations of bona fide surpluses after meeting out of Income every element of operating expense properly attributable thereto.

OPERATIONS OF 1919:

POWER COST: The electric current purchased from the Hydro-Electric Power Commission of Ontario during the year cost $812,867.47 or 32.5% of the gross income, against $824,251.36 for the preceding year or 35.0% of the gross income of that year. The yearly averages of the monthly peak loads from the first complete year of the enterprise to the end of 1919 are as follows:—

Year.	H.P.
1912	10,794
1913	17,051
1914	21,572
1915	28,722
1916	36,158
1917	44,855
1918	54,392
1919	47,600

The reduced average for the year 1919 is due principally to the slowing down of the munitions manufacturing industries occasioned by the Armistice, and to the inability of the Hydro-Electric Power Commission of Ontario to furnish additional power. For the latter reason the Commission restricted as much as possible the new business for the year 1919. At the governing rate of $14.50 per H.P. fixed by the Provincial Commission the charge for the year would have been $706,012.96 or only 28.2 per cent. of the gross income. After the close of the year's operations, however, the Provincial Commission advised your Commissioners that the cost of the power supplied them during the year was $106,854.51 greater than had been charged under the standard rate aforesaid, and they directed your Commissioners to assume this deficiency, thereby raising the cost for the year to the sum of $812,867.47 as stated above, or $16.70 per H.P. instead of the standard rate of $14.50 per H.P.

OPERATING EXPENSES: The expenses of operation and management amount to $764,255.03 or 30.5 per cent. of the gross income against $661,301.83 for the preceding year or 28.1 per cent. of the gross income of that year.

This increase is partly due to labor conditions. In common with the majority of other employers, your Commissioners found it necessary during the year to grant substantial increases to the employees of the System. The additional burden so assumed is not fully reflected in the accounts for the reason that the increases did not come into force until after midsummer. A further increase has been requested this year. This was referred to a Board of Conciliation which at the time of writing has just issued its report in favor of a further increase. Your Commissioners have not yet, however, had an opportunity of considering the merits of the further increases so recommended. Such increases combined with the rising cost of materials and the impossibility, owing to the shortage of power, of increasing the output will in all probability lead to a necessary increase in consumers' rates.

CHARGES AGAINST OPERATING SURPLUS: The usual provision has been made for Interest, Depreciation, Sinking Funds, and Serial Debenture retirals.

An additional element appears, however, this year, in the provision of $18,831.33 for "exchange on payments in respect of Interest and redemption of Debentures." This was occasioned by some of the Debentures having been made payable both as to principal and interest in New York as well as in Toronto in consequence of which remittances had to be made to New York subject to the heavy discount on Canadian funds ruling at the times thereof. The obligation assumed to pay in New York was no doubt a necessity at the time the debentures were issued. This is an explanation of the cause of the charge; not a criticism of the terms attached to the debentures. In view of the adverse rates of American Exchange now prevailing and the tendencies thereof, a much larger outlay may be incurred during the current year for the same purpose.

Until equilibrium is restored between the reciprocal —and currently maturing—indebtedness of Canada and the United States, or until gold moves freely from the Dominion in settlement of international balances, rates of exchange adverse to Canada are liable to continue which may on occasions prove very severe. The possible consequences of this should be well considered when Canadian municipalities consider Canadian versus American bids for their debenture issues and when they make them payable in gold in the United States. The obligation to pay the principal and interest of a Canadian debenture issue, in gold in New York, would prove seriously burdensome if the covering remittances had to be made at a premium of from say ten to fifteen per cent. as has been quite common of late. No one who fully appreciates the present International, Economic and Financial problems of the world would venture to place a limit of 15% or even 25% upon the possible maximum of adverse exchange, or any limit upon the period of its duration, or to hazard the opinion that immunity from its recurrence would follow the restoration of normal conditions, even though such restoration proceeded solely and wholly from the recovery of internal strength.

In the meantime it is worth noting that a five-year six per cent. Canadian debenture sold at par in Canadian funds, with half-yearly interest and principal payable in gold in New York, would cost the issuing municipality a little over 8 per cent. per annum if the covering remittances had to be made at an average adverse exchange rate of 10 per cent.; and if the average exchange should be 15 per cent. the cost of the loan would be a little over 9% per annum. If six per cent. serial debentures were issued, and sold at par in like funds, with equal annual instalments of principal maturing over five years, payable as to principal and half-yearly interest in gold in New York, the cost to the borrowing municipality would be approximately 9½ per cent. per annum on an average adverse exchange rate of 10 per cent. and approximately 11½ per cent. per annum on a like rate of 15 per cent. Shorter term loans would be still more costly—and especially so in the case of serial debentures—by reason of the exchange premium settling over a shorter period. These are illustrations—and illustrations only—of the effect of adverse American exchange on the cost of money borrowed under the conditions outlined. It is not suggested that five-year 6 per cent. debentures is a normal mode of municipal financing. In view, therefore, of the general uncertainty of the outlook, and the additional dangers inherent in the disturbed state of the world-at-large—dangers that are not by any means sufficiently realized by many, and that may well affect international trade for a long time to come —it is only the part of ordinary prudence to refuse to assume such an obligation except in cases when the money is an absolute necessity and when it cannot be obtained on other terms. During normal pre-war times this risk was negligible and by reason of the greater marketability imparted to debentures by the condition in question it was freely assumed. Under present conditions, however, in the case of debentures that are marketed in Canada the obligation should not be assumed. Debentures sold and marketed in the United States must, of course, under present conditions, be made payable in gold in the United States. But when such debentures are sold and marketed in Canada, and when such obligation is unnecessarily assumed, it puts it in the power of the Canadian investor to cash his coupons and collect his principal in New York whenever the rate of exchange is favorable to him and to obtain thereby an additional profit at the cost of the borrower.

These are not submitted as reasons why Canadian Municipalities should not assume the necessary business risks that others must accept, but as reasons why they should not assume unnecessary business risks. The patriotism of Canadian Bond houses may therefore surely be relied upon—in view of the heavy burdens bequeathed by the war—to assist in protecting the country from risks of this kind when the monetary conditions of the time permit. With the cessation of Dominion War Loan issues there will, of course, be a corresponding increase in the power of the Dominion to absorb its own municipal issues.

GROSS INCOME AND OUTPUT: Despite the power shortage, the gross income increased by 6.4 per cent. over that of 1918; and the commercial income by 4 per cent. over that of 1918. The commercial income for the year amounted to 72.8 per cent. of the total as compared with 78 per cent. in 1918, 71.8 per cent. in 1917, 67.0 per cent. in 1916, 66.4 per cent. in 1915, 63.9 per cent. in 1914 and 59.05 per cent. in 1913. The fol-

Following table gives other instructive details of output, load and progress:—

End of	Meters in use	Street lights in use	K.W. hours sold	Connected load H.P.	Peak load H.P.
1912	[illegible]	33,824	35,176,548	46,296	17,198
1913	24,999	38,944	65,052,951	68,461	22,520
1914	33,976	40,596	82,927,015	90,162	28,753
1915	39,284	43,111	109,501,981	111,413	40,180
1916	41,013	45,212	139,003,756	125,840	47,165
1917	50,461	45,841	171,691,213	169,818	56,662
1918	53,598	29,527	230,413,561	184,930	60,154
1919	63,762	45,091	180,609,938	176,351	59,618

Owing to the shortage of power during 1918 and 1919 it was necessary to stop canvassing for new business and to curtail the street lighting.

DOUBLE INCIDENCE OF SINKING FUNDS AND DEPRECIATION RESERVES:

It is perhaps worth while again drawing attention to the double incidence of the Sinking Funds and the Depreciation Funds. If the enterprise were endowed with permanent capital issued in the form of irredeemable Capital Stock as is common to joint stock companies, the Sinking Fund charges that now have to be met out of income would be avoided; and the most severe obligation of sound finance would only require that depreciation funds sufficient to replace the Buildings and Equipment as they wear out should be accumulated out of Income. In view of the fact, however, that the capital of the enterprise has been raised by means of debentures that require to be paid off at maturity, it is ncessary that such a sum be set aside out of income each year as will with the interest accruing thereto from its proper investment, amount to sufficient to pay the debentures at maturity. In the case of serial debentures which mature at specified rates from year to year, the amount of each year's maturity must be provided out of each year's income. As the Plant wears out it must, of course, be replaced, and to save making new debenture issues from time to time under the obligation of the Corporation of the City of Toronto to provide the new replacement plant, it is also necessary to accumulate out of income a depreciation fund sufficient therefor. Hence a municipal utility such as this, while rendering service at cost, must include within its costs for the purpose of rate-making, not only the necessary annual sinking fund instalments and the necessary serial debenture instalments to retire the debenture capital at maturity, but also the depreciation funds required to replace the plant as it wears out.

It has been estimated by the officers of the Commission that the rates for residential and commercial light and power that have been charged during the past eight years have saved its customers not less than approximately $17,000,000 of the aggregate they would have paid had the normal rates that were in force in this city at the inception of the enterprise been continued.

That the Toronto Electric Commission has been able to meet the double charge above-mentioned from which private enterprise, when carried on with irredeemable capital, is exempt; to relieve the credit of the Ratepayers of the burden of replacement debentures; and to furnish light and power at the rates, and with the savings to the public that have been mentioned, will perhaps be regarded as a sufficient vindication—at least from the material and administrative points of view—of the policy of establishing The Toronto Hydro-Electric System and of the work of your Commissioners. It is only just, however, in this connection, to acknowledge the exceedingly valuable work of the General Manager, Mr. H. H. Couzens. For the past seven years he has rendered services that have been uniformly marked by capacity of the highest order combined with fidelity and courtesy in equal degree. During this whole period he has had no holidays and during the war period and especially when the shortage of power was acute, he laboured incessantly with a cheerful willingness beyond all praise. The manufacturers of the City are greatly indebted to him for the ingenuity he displayled in limiting substantially the interruptions in their service and their consequent losses. He is now about to proceed to Europe on a well-deserved three months leave of absence, and your Commissioners wish him all the rewards that such high service entitles him to.

POWER SHORTAGE:

A reference to the power shortage with which all are more or less, while some are painfully, familiar, is expedient. The impression—which as a matter of fact was entirely baseless—that the shortage might have been avoided by the exercise of proper foresight, gained a limited credence. The simple and fundamental fact is that it was due to a demand for power that, on occasions, was greatly in excess of the available supply. The excess demand itself was largely the result of war conditions. The special demands occasioned by munitions manufacturing, and the further demands created by the scarcity and costliness of coal which diminished the supply and raised the price of competing power, combined to make abnormal demands on Niagara Hydro-Electric power. Generating stations cannot be built overnight and the result was an inevitable shortage which while severely felt by many, could not have been avoided by anyone under the controlling circumstances of the time.

Your Commissioners understand that the power at present available at Niagara Falls for distribution to the Municipalities is approximately 185,000 H.P.; that the Provincial Commission is supplying approximately 40,000 H.P. to individual consumers in Ontario; that it is exporting approximately 50,000 H.P. to the United States under contracts entered into by the Ontario Power Company prior to the acquisition thereof by the Provincial Commission; that in all probability the Queenston-Chippawa development, which was commenced by the Provincial Commission in 1917, will by the fall of 1921 have a first instalment of 100,000 H.P. available for commercial use; and that no appreciable increase in the allotment of power to the participating municipalities can be expected until the Queenston-Chippawa development reaches the stage indicated. It therefore appears probable that the power shortage during the coming winter will be at least as severe as during the last winter. In cases where an uninterrupted supply is of paramount importance it would seem that the only way to secure such in the meantime is by making some arrangement for auxiliary power. It is unnecessary to say that your Commissioners will at all times do the best that can be done with the resources at their disposal but they cannot deliver power that they cannot obtain. It is beyond the present power of man to prevent the interruptions to a regular supply that are caused by changing winds, accumulations of ice, and other contingencies affecting the generating stations and the transmission plant alike.

The lesson—so far as the Toronto System is concerned—from the shortage actual and prospective, and from unavoidable interruptions in the service seems to be that a powerful steam reserve plant is a necessity. Such a reserve plant would furnish, up to the limit of its capacity, substitutionary power in times of stoppage and supplementary power in times of shortage. With the present high cost of construction and of coal it is obvious that both capital and operating costs of such a plant would be high and that corresponding increases in the rates would be necessary. The matter, however, is of such vital importance to manufacturers and other users of power that the additional cost would be little compared with the losses it would avoid.

Another conclusion to which the shortage points is that the Government should acquire and develop, prudently by degrees, and on just terms, the principal power sources and power plants of the Province. It is unquestionable that the Governmental and Municipal Hydro-Electric movement in the Province of Ontario restrains private ownership from developing such sources and plants to their fullest service efficiency. The dependence of the commercial, industrial and related interests of the Province on ample supplies of power at the lowest practicable cost fully justifies such a policy. It is further necessitated by the present absolute dependence of the Province on the United States for coal supplies. While the policy of the American Government and the attitude of the American people have, in this matter, been just and considerate in the past, the United States has its own industrial, political, and other difficulties to contend with. These difficulties cannot fail to cause a justifiable apprehension that a stoppage of sufficient supplies for the needs of the Province is a possibility fraught with most serious consequences to the economic life of the Province and to the friendly relations between the respctive countries. It should therefore be the policy of both the Dominion and the Ontario Governments to free the important interests at stake, as much as possible, from all such risks. The two countries are dependent on each other in respect of many vital matters. An absolute embargo by either on the export of necessities to the other, except in times of great justifying national emergencies, would be inconsistent with the friendly relations of the past, the ideals of both American and Canadian peoples, and fatal to future amity. A policy of reprisals which would be the inevitable consequence of an unnecessary embargo would inflict serious commercial injury on both peoples apart altogether from other consequences. Our sources of economic independence should be developed to the full for reasons both of national pride and of national well being.

Further, under competent guidance, the investments involved in such a policy would be self-sustaining, and could be made a source of public revenue, while in addition they would greatly increase the producing and competing capacity of the people of Ontario—two of the great necessities of post-war times.

The value of Hydro-Electric energy is illustrated in some measure by comparing the quantity of bituminous coal imported into the City of Toronto in the year 1919 with the quantity that would have been required had Hydro power not been available. The official figures indicate that in the year 1919, 851,481 tons of bituminous coal were brought into Toronto. To generate from steam the power purchased by the Toronto Hydro-Electric System from the Provincial Commission during that year would have required approximately 358,000 additional tons of coal. The cost of this coal would have been more than three times the amount paid for the power taken from the Hydro-Electric Power Commission of Ontario. The quantity of coal that would be required to generate the total quantity of power sold by the Toronto Hydro-Electric System to its customers since the beginning of its operations would be over 2,000,000 tons, and the cost, based on prevailing prices from year to year, is estimated at over $10,000,000 as against a cost for the electric current taken from the Provincial Commission of approximately $4,100,000. In addition to the great saving so effected by the substitutionary use of electric power, this has had during the last year, an appreciable effect in relieving the adverse exchange situation, while it has also been of material value in relieving overtaxed transportation facilities, and releasing coal for heating purposes. When the coal savings arising from the whole Niagara water power developments are taken into account the resultant benefits of the kinds indicated are enormous.

FLAT RATES:

The proposal has been made in some quarters that power should be delivered to all municipalities within the Niagara zone by the Hydro-Electric Power Commission of Ontario at the same rate. While it is improbable that this proposal will be seriously entertained in responsible quarters it is perhaps worth while pointing out that the delivery of electricity, involving, as it does, a cost varying with the distance traversed and the quantity transmitted, resolves the proposal into a plan to subsidize consumers in certain districts at the expense of those in other districts, and as such it it not likely to be received with favor where a proper sense of commercial independence, rectitude and fair play prevails. Further, the entire Municipal Hydro System is founded upon a number of binding contracts between the separate participating municipalities and the Provincial Commission. In these contracts the basis of charge is clearly set out, and the investments of the participating mnuicipalities have been made in good faith on the strength thereof. To treat these contracts as "Scraps of Paper" would provoke most serious litigation, would destroy all faith in, and ultimately would wreck the movement beyond hope of repair.

CONCLUSION:

Your Commissioners with your full approval and with the full support of public sentiment authorized during the war period a number of patriotic subscriptions and special grants to employees with the colors and to their dependents. These subscriptions and grants amounted to a total of $83,450.04, of which $72,028.82 was paid to dependents of employees with the colors.

Now, however, the war is over. The great arch-enemy of freedom and the deadly enemy of the British Empire has been utterly overthrown. Let humble thanks be given. The most stupendous catastrophic drama of human history has engaged the world's stage during the past six years. The events are still too close at hand to be seen in their full magnitude, and the terrible consequences in their final relentless expression have not yet sufficiently developed to be appreciated aright. The highest pinnacles of sacrifice have been scaled by a dauntless heroism never surpassed in the history of the world. The lowest depths of infamy have also been sounded. We may try to forget the infamy but the indelible proofs of the unimaginable suffering it begat, remain among us, and forbid—and rightly forbid—that we should forget it. But while remembering it as a protection against the foolish, insidious, and fatal optimism that would gamble with the rights, liberties and dignities of free peoples, let us turn with concentration of purpose to the new duties before us. The call of the day is for reconstruction and repair. The unity of purpose that animated the people of this country, in common with their kith and kin across the seas and with their gallant Allies in the high but tragic duties of the war, should no less animate them in the tasks of peace. The legacies of the War in the way of material burdens are heavy; but the recuperative power of the country is great and adequate. Class strife must cease; co-operation and goodwill must take its place; thrift and honest toil must reassert their power if the future of the country is to be assured. Governmental and Municipal no less than private economy must be the order of the day. Extravagant public loans and projects should be anathema. Only thus will our duty to ourselves and our higher duty to posterity be discharged. The real spirit of the people of the Dominion has shown itself in many crises. Your Commissioners believe that that spirit will not be invoked in vain as we turn once more to the paths of peace. The high duty and privilege of caring adequately for the blighted lives among us—the heritage of war—must ever remain in the forefront as a sacred task—a first charge upon the hearts and the possessions of all

Respectfully submitted,

P. W. ELLIS, Chairman.
T. L. CHURCH, Mayor.

GEO. WRIGHT, Commissioner.

Toronto, 15th July, 1920.

TORONTO HYDRO-ELECTRIC SYSTEM

Balance Sheet as at 31st December, 1919

ASSETS

FIXED ASSETS

Lands, Buildings, Transmission System, Substation Equipment and Feeder System, Distribution System, Municipal Street Lighting System, Line Transformers, Meter Equipment and Devices, General Office, Stores Department, Utility Department and Miscellaneous Equipment, Miscellaneous Construction and Equipment Expenditures, and Exhibition Construction and Equipment	$9,555,450.95	
Leasehold Premises and Improvements	36,609.11	
	9,592,060.06	
Debenture Discount and Expenses (less Debenture Premium)	629,764.53	
		$10,221,824.59

NOTE—Provision for writing off Debenture Discount and Expenses at the maturity of the respective debenture issues is secured by the annual charges against the earnings in respect of Sinking Fund.

CURRENT ASSETS

Stores on Hand and Apparatus on Loan, less reserve for Contingencies	492,408.14	
Accounts Receivable (including Orders in Progress) less Reserve for Estimated Losses ($58,193.27)	378,857.05	
Cash on Hand and in Bank..	170,495.78	
Cash on Deposit with Trust Companies and accrued interest	304,695.20	
		1,346,456.17
Deferred Charges to future operations		23,513.54
		$11,591,794.30

LIABILITIES

CAPITAL ACCOUNT

Corporation of City of Toronto:— Sinking Fund Debentures:		
By-law No. 5036, Cash Advanced	$2,240,124.55	
Debenture Discount and Expenses	509,875.45	
		$ 2,750,000.00
By-law No. 5918, Cash Advanced	1,816,774.89	
Debenture Discount and Expenses	383,225.11	
		2,200,000.00
By-law No. 6674, Cash Advanced	641,335.00	
Debenture Discount and Expenses	58,665.00	
		700,000.00
By-law No. 7176, Cash Advanced	906,700.00	
Debenture Discount and Expenses	93,300.00	
		1,000,000.00
Instalment Debentures:		
By-laws No. 7584 and 7642, Cash Advanced	1,243,469.76	
Debenture Discount and Expenses	4,530.24	
	1,248,000.00	
Deduct: Amount redeemed to date under terms of By-law	67,365.50	
		1,180,634.50
By-law No. 7875, Cash Advanced	701,150.40	
Debenture Discount and Expenses	34,849.60	
	736,000.00	
Deduct: Amount redeemed to date under terms of By-law	43,000.00	
		693,000.00
By-laws No. 7792 and 8052, Cash Advanced	655,395.00	
Deduct: Debenture Premium	5,395.00	
	650,000.00	
Deduct: Amount redeemed to date under terms of By-law	19,000.00	
		631,000.00
Total Bonded Debt		$ 9,154,634.50
Less Funds in City Treasurer's hands for redemption		910,100.61
Net Bonded Debt		$ 8,244,533.89

CURRENT LIABILITIES

Corporation of City of Toronto:—		
Sinking Fund Instalments accrued	22,877.61	
Serial Debenture Instalments accrued	33,868.60	
Accounts Payable and Accrued Charges	227,648.60	
Total Current Liabilities ..		$ 284,394.81

RESERVES

For Depreciation of General Assets	1,591,533.25	
For Depreciation of Leasehold Property	44,167.95	
For Workmen's Compensation and Public Liability ..	45,755.84	
For Contingencies	92,538.37	
For Sinking Fund	910,100.61	
By Redemption of Serial Debentures	129,365.50	
For Exchange on Payment of Debentures and Debenture Interest	18,831.33	
From Hydro-Electric Power Commission of Ontario ..	129,125.46	
		2,961,418.31
Surplus		101,447.29
		$11,591,794.30

Revenue Account for the Year Ended 31st December, 1919

Section I: Showing Net Income from Operation of Year

CHARGES

DR.		
To Cost of Electric Current at Schedule rate (together with supplementary charge of $106,854.51)	$812,867.47	
To Expenses of Operation and Management, including Repairs, Maintenance and Accrued Charges, Provision for Proportion of Special Depreciation of Leasehold Buildings and Improvements ($20,122.28) and Reserve for Doubtful Accounts Receivable	764,255.03	
		$1,577,122.50
To Net Income available for Fixed Charges Carried Forward to Section II.		927,635.81
		$2,504,758.31

INCOME

CR.		
By Sale of Current for:—		
Lighting	$946,313.53	
Power	1,120,944.51	
Street Lighting	322,773.70	
Exhibition	17,924.21	
Other Municipalities	5,585.04	
		$2,413,540.99
By Income from sundry other sources		91,217.32
		$2,504,758.31

Section II: Showing Disposition of Net Income

To Interest		$403,935.21	
To Depreciation		340,427.05	
To Exchange on Payment of Debentures and Debenture Interest		18,831.33	
To Sinking Funds:—			
Under City By-law No. 5036	$36,471.54		
Under City By-law No. 5918	34,255.92		
Under City By-law No. 6674	9,283.67		
Under City By-law No. 7176	13,262.38		
	$93,273.51		
To Redemption Funds:—			
Under City By-laws Nos. 7584 and 7642	$24,148.21		
Under City By-law No. 7875	22,500.00		
Under City By-laws Nos. 8052 and 7999	19,500.00		
Under Agreement with Provincial Hydro-Electric Power Commission re supply outside City	**869.18**		
		$160,290.90	
To Net Income Carried to Surplus Account		4,151.32	
			$927,635.81

By Net Income available for Fixed Charges brought forward from Section I.	$927,635.81
	$927,635.81

Surplus as at 31st December, 1919

To Balance Carried Forward	$101,447.29
	$101,447.29

By Balance Brought Forward from 1918	$63,977.59
By Adjustments of Reserves re Power Accounts (1918)	33,318.38
By Net Income from Operations of Year 1919	4,151.32
	$101,447.29

Certificate of Auditor

Toronto, June 8th, 1920.

To the Toronto Electric Commissioners:

I have completed the audit of the accounts of the Toronto Hydro-Electric System for the year ended 31st December, 1919, and certify that the attached Balance Sheet is properly drawn up, and, in my opinion, sets forth the financial position of the System, as shown by the books as at 31st December, 1919.

The item of $129,125.46 for the Hydro-Electric Power Commission of Ontario, which is included among the Reserves, has the qualities of a Surplus as well as of a Reserve.

I have examined the Accounts Receivable and have verified the Cash Balances. Inventories for materials on hand have been produced and certified by the proper officials.

(Sgd.) SHOLTO C. SCOTT, Chartered Accountant,
Auditor.

Current News and Notes

Brockville, Ont.

A. G. Dobbie & Co., King St. W., Brockville, Ont., have been awarded the contract for the electrical work on the new college on Perth St., Brockville.

Brantford, Ont.

The Lyons Electric Co., 42 Colborne St., Brantford, Ont., have been awarded the contract for the electrical work on the new factory of the A. C. Spark Plug Co., Brantford, Ont.

The Brantford Hydro Commission announced recently a reduction in rates of street lighting and power. The ordinary incandescent lamps throughout the city which cost, when Hydro was first installed, $8.50 per year, will in future be $6.50 and the arc lights will be $5 per year cheaper to the city. The reduction in power charges constitutes a lowering of 8 per cent.

Cornwall, Ont.

The Delco Light Products Co., Dayton, Ohio, recently held a convention of Delco light users at Cornwall, Ont. Mr. E. G. Burne, of the staff at Dayton, addressed the convention explaining the construction of Delco light plants.

Cairnsville, Ont.

Lyons Electric 42 Colborne St., Brantford, Ont., have been awarded the contract for the electrical work on the new school at Cairnsville, Ont.

Edmundston, N. B.

The Fraser Companies, Ltd., Edmundston, N. B, are extending their pulp mill and plan to extend their power plant also. A large generator will be installed.

Edmonton, Alta.

The Hillas Elec Co, 10823 Jasper Ave, Edmonton, Alta., have been awarded the contract for the electrical work on a new $179,000 theatre and office block on 103rd St., Edmonton.

B. L. Perry, 10033-102nd St, Edmonton, Alta, have been awarded the contracts for the electrical work on the addition to the Jesuit College on 138th St. and the new biscuit factory on 102nd Ave., Edmonton.

East Kildonan, Man.

Messrs. McDonald Bros. & Wilson Lighting Co., Winnipeg, Man, have been awarded the contracts for electrical work on two new schools in East Kildonan, Man.

Guelph, Ont.

The Guelph Housing Commission, Macdonell St., Guelph, Ont., are erecting 11 residences and will let the electrical work. They have let the contract for the electrical work on 14 residences to R. Christie, 184 Edinboro Rd, Guelph.

Hamilton, Ont.

Messrs. Culley & Breay, 35 King St. W., Hamilton. Ont, have been awarded the contract for the electrical work on the new nurses home at the Mountain Sanatorium. Also the contract for work on the new additions to the Picton St. School. Both at Hamilton.

The Hamilton Hydro employees held their annual picnic at Bronte beach on Saturday, July 10.

J Dynes. 20 Avalon Place, Hamilton, Ont, has been awarded contracts for the electrical work on an apartment house on Sherman St. and a drug store on the corner of King and Sherman Sts., Hamilton.

Pantages Theatres are erecting a new theatre on King St., Hamilton, Ont., at a cost of $350,000 and will let the electrical work. Architect, Thos. W. Lamb, 39 Adelaide St. W., Toronto.

The Mercury Mills, Ltd., Cumberland Ave., Hamilton, Ont., are making a $100,000 addition to their factory. The electrical work will be carried out by their own staff.

Halifax, N. S.

The S. Morgan Smith Co., York, Pa., have been awarded the contract for turbines for the new power development at St. Margarets Bay, N. S.

Kingston, Ont.

Kingston, Ont., has been allotted another 500 h.p. by the Ontario Hydro-electric Commission. The city asked for 2000 h.p.

Kitchener, Ont.

The Light Commission of Kitchener, Ont., is erecting a new station on Breithaupt and Edward Sts.

The Dominion Tire Co., 140 Strange St, Kitchener, Ont., are erecting a sub-station on Dominion St., Kitchener.

Messrs. Reinhart & Doerr, King St., Kitchener, Ont., have been awarded the contract for the electrical work on the alterations to the King Edward School, Kitchener.

Messrs. Ellis & Howard, Queen St. N., Kitchener, Ont., have been awarded the contract for the electrical work on the additions to the Philip Gies foundry on Water St., Kitchener.

Moncton, N. B.

The Eastern Amusement Co. are erecting a $200,000 theatre on Main St., Moncton, N. B., and will let the electrical work. Architect, R. A. Frechette, 30 Bonacord St, Moncton.

The T. Johnston Co., Ltd., 736 Main St, Moncton, N B., have been awarded the contract for the electrical work on the new foundry on Lutz St., Moncton.

Ratepayers have rejected by a small majority the proposition of the city council to purchase the Moncton Tramways, Electric and Gas Company's street railway and electric light plant.

Montreal, Que.

The Montreal city authorities are installing a new electric motor for a twelve million gallon pump in the city pumping station.

The Art Brass Works Co., Ltd., 250 Beaver Hall Hill, Montreal, Que., have been awarded the contract for the electrical work on a new $150,000 office and loft building on Juror St., Montreal, also for work on a new office and warehouse on Mayor St, Montreal.

Messrs. Valee-Hamelin, 1867 St. James St., Montreal, have been awarded the contract for electrical work on 24 tenements on Sherbrooke St., Montreal.

Messrs. Selkirk Bros, 2308 Waverly St., Montreal, have been awarded the contract for electrical work on a new

CADMIUM-COPPER WIRE

— THE WIRE FOR WEAR —

During the War the whole of our output of Cadmium-Copper Wire was taken by the European Governments for War purposes.

We are now once more in a position to supply the requirements of our customers for this well-known wire in all sizes for Trolley Wire, Transmission Lines, Telegraph Wire, &c.

CONDUCTIVITY 7% TO 10% LESS
TENSILE STRENGTH 10% TO 75% GREATER } THAN HARD DRAWN COPPER
According to size of wire.

As an Asset Cadmium-Copper has the same Scrap Value as Electrolytic Copper.

TROLLEY WIRE

is manufactured by us in

ROUND,
GROOVED,
NON-FOULING,
SPECIAL SECTIONS

and has been supplied by us to the principal Street Railway Systems of the Dominion. The following Report was received by us from the Superintendent of one of the largest systems:—

> "On May 8th, 1919, we strung the outside curve with a sample of this wire. The opposite curve in the same direction had been strung with ordinary trolley wire a very short time previous.
>
> "On December 21st both curves were measured with a micrometer. This would give each curve 228 days' service, and taking 365 mils as the diameter of a 2/0 wire, we found that the maximum wear at any point on the cadmium wire was 20 mils, while the maximum wear at any one point on the ordinary copper wire was 60 mils. The average wear on the cadmium wire was 5 mils, and on the copper wire about 20 mils.
>
> "At the above rate of wear the cadmium curve should last **between two and three times longer** than the other curve."

SERVICE COUNTS

Eugene F. Phillips Electrical Works, Limited

ESTABLISHED 1889

Head Office and Factories - MONTREAL

bank and manager's residence on the corner of Bernard and Park Aves., Montreal.

V. E. Lambert, 350 Marcel Ave., Montreal, is building 8 residences on Wilson Ave, Montreal, and will let the electrical work.

The Berliner Gram-o-phone Co., Ltd., St. Antoine St., Montreal, are erecting a $100,000 power house and will let the electrical work.

A. Bryon, 745 Evelyn Ave., Verdun, Que., has been awarded the contract for the electrical work on the Western Ave. R. C. Church, Montreal.

Messrs. McDougall & Pease, 511 St Catharine St. W., Montreal, Que, engineers for the new $280,000 factory on Van Horne St., Montreal, will let the electrical work.

C. Labelle, 43 Garnier St., Montreal, has been awarded the contract for electrical work on a new $150,000 apartment house on Grey St, Montreal.

E. A. Barry, 239 Mount Royal Ave, Montreal, is erecting a $35,000 residence, and will let the electrical work.

Messrs. Vincent & Say Elec Co, 351 Union Ave, Montreal, have been awarded the contract for the electrical work on the new Mount Royal Model City school at Montreal.

Nanaimo, B. C.

C. F. Wilson, Nanaimo, B. C., general contractor for the new station for the Esquimalt & Nanaimo Railway, will let the electrical work The station is to cost $100,000.

Port Arthur, Ont.

C. D. Howe & Co., Whalen Bldg., Port Arthur, Ont., constructional engineers for the new $500,000 mill of the Kaministiquia Pulp & Paper Co., will sub-let the electrical work.

Ottawa, Ont.

The Bank Electric Supply Co., 232 Bank St, Ottawa, Ont., have been awarded the contract for electrical work on 10 residences at Lindinlea, Ottawa, Ont

H. L. Allen, 272 Bank St., Ottawa, Ont, has been awarded the contract for the electrical work on 50 residences at Lindinlea, Ottawa.

Stan Lewis, Metcalfe St., Ottawa, has been awarded the contract for the electrical work on the new warehouse of the Dominion Express Co., 219 Queen St, Ottawa.

Mr. Ladouceur, c/o R. F. Morphy, 254 Albert St., Ottawa, has been awarded the contract for electrical work on 10 residences at Lindinlea, Ottawa, Ont.

Ridgeway, Ont.

Messrs. Reid & Co., Cross St., Welland, Ont., have been awarded the contract for the electrical work on the new school at Ridgeway, Ont.

Regina, Sask.

Light and power rates in Regina have been advanced 9 per cent., making a total increase in the last twelve months of about 20 per cent.

The Sun Electric Co., Regina, Sask, have been awarded the contract for the electrical work on the new Miner Rubber Co. warehouse, Broad St, Regina, Sask. Also for the work on the new warehouse of the McLean Grocery Co., Rettalick St., Regina.

St. Catharines, Ont.

It is reported that the Welland Division of the Grand Trunk Railway, which parallels the Welland Canal from Port Colborne to Port Dalhousie will be electrified shortly.

Saskatoon, Sask.

C. D. Kirk & Co, Tribune Bldg., Winnipeg, Man., have been awarded the contract for the electrical work on the new Avenue A. Normal school, Saskatoon, Sask.

Sherbrooke, Que.

J. A. Choquette, 76 King St., Sherbrooke, Que., has been awarded the contract for electrical work on four tenements and four stores on Belvidere St., Sherbrooke, Que.

Stratford, Que.

The rates for commercial and domestic electric lighting have been reduced twenty per cent by the Public Utilities Commission of Stratford, Ont., to take effect from July 1st. Electricity for domestic use will now cost 2 cents per kilowatt hour for service up to the total of the house area charged instead of 2½ cents as formerly, and 1 cent per kilowatt hour after that instead of 1¼. The area charge of 3 cents per 100 square feet remains as before. A new feature introduced is a minimum charge of 50 cents per month. The commercial rates show a straight 20 per cent. reduction.

St. John, N. B.

The Maine & New Brunswick Power Co. are extending their power plant at Aroostock Falls, N. B. The capacity of the plant will be increased approximately 2400 hp.

Toronto, Ont.

The Canadian Comstock Co. Ltd., North Union Station, Toronto, have been awarded the contract for electrical work on the new Dunlop Rubber Co manufacturing building on Queen St., Toronto, Ont.

Messrs. Harris & Marson, 81a Parkway Ave., Toronto, have been awarded the contract for the electrical work on the alterations to the Dewson St. school, Toronto, at a price of $2,290.

Messrs Richardson & Cross, 79 King St. E., Toronto, have been awarded the contract for the electrical work on the new branch of the Bank of Nova Scotia, at the corner of St. Clair and Oakwood Aves., Toronto.

The Canada Electric Co., 175 King St. E., Toronto, have been awarded two contracts by the Paramount Theatre Ltd, for theatres at Sault Ste. Marie and Oshawa, Ont.

Three Rivers, Que.

The Three Rivers city engineer, Zephirin Lambert, wants prices on a 100 hp. electric bynehronous motor, 62 cycle, 900 revs., 75 amps. and 2,200 volts.

Vancouver, B. C.

It is reported that work will commence shortly on an electric power plant that will ultimately develop 175,000 horsepower in the Okanagan Valley in British Columbia The site chosen is about eighty miles west of Kamloops on the P. G. E. railway, and the Bridge River Power Company has the project under contemplation.

Woodville, Ont.

The Linnington Connell Co., Ltd., 1254 Dundas St. W., Toronto, have been awarded the contract for the electrical work on the Presbyterian church, Woodville, Ont.

West Kildonan, Man.

The Sutherland Construction Co., 301 Merchants Bank Bldg., Winnipeg, Man., general contractors for the new school at West Kildonan, Man, wants prices on the electrical work.

Victoria, B. C.

The Wittall Electric Co., 1112½ Broad St., Victoria, B. C., have been awarded the contract for the electrical work on several new stores on Douglas St, Victoria, B. C.

The Canadian National Railways, head office Toronto, Ont., are erecting a new round house at Soughees Reserve Area, B. C., and will let the electrical work.

Electrical News

Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

THE PUBLISHING HOUSE of MACLEAN

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 296 Broadway
CHICAGO - - Room 803, 63 E. Adams St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, August 15, 1920 No. 16

Alberta Government Passes Comprehensive Electric Protection Act.

The Electrical Protection Act which has just been passed by the Alberta Government places its stamp of approval upon the Schafer prone method of resuscitation. Article 87 of the act reads:

"All employers shall obtain from the Workmen's Compensation Board printed instructions and cuts on the Schafer Prone Pressure method of resuscitation, which they shall distribute to each and every workman installing and maintaining electrical apparatus.

"The Board may, at its discretion, hold sessions of instruction for this method at the plant or place of business of any employer, and it shall be the duty of the employer to allow said workmen to attend such sessions."

The act also deals with the much discussed question of "grounding" in the following paragraphs:

"Grounding Secondaries.—The neutral point or wire of all transformer secondaries strung or erected for use in low potential distributing systems shall be grounded in all cases where the normal maximum difference of potential between the ground and any point in the secondary circuit will not exceed one hundred and fifty (150) volts where metal water pipes or other effective ground is available. When no neutral point of wire is accessible, one side of the secondary circuit will be grounded in the case of single phase transformers and any common point in the case of interconnected polyphase bank or banks of transformers.

"Grounding Electrical Equipment. (General).—The secondary circuit of current transformers, the casing of all potential regulators and arc-lighting transformers, all metal frames of all switch boards, metal oil tanks used on all switches except where the tank is part of the conducting system, all motor and generator frames, the entire frame of cranes and the tracks of all travelling cranes and hoisting devices shall be thoroughly grounded.

"Methods of Grounding. (General)—The grounding provided for in these regulations shall be done in the following manner: By connecting a wire or wires not less than No. 6 B & S gauge to a water pipe of a metallic system outside of the meter, if there is one, or a copper plate one-sixteenth inch thick and not less than three (3) feet wide by six (6) feet long buried in coke below the permanent moisture level or to other device equally efficient. The ground wire or wires of a direct current system of three or more wires shall not be smaller than neutral wire at the central station and not smaller than a No. 6 B & S gauge elsewhere.

"Provided that the maximum cross-section area of any ground wire or wires at the central station need not exceed one million circular mils. The ground wire shall be carried in as nearly a straight line as possible and kinks, coils and short bends shall be avoided.

"Provided, further, that the provisions of this regulation shall not apply as to size of ground wires run from instrument transformers or meters.

"Ground pipes or multiple of pipes shall be deemed an efficient ground providing the resistance is not greater than 25 ohms."

Increased Efficiency in Railway Operation by Use of Coasting Recorders

It does not require an electrical engineer or an executive holding a high position in the management of a railway company to demonstrate the fact that many electric railway motormen operate their cars with a very high degree of inefficiency. There are many reasons for this condition—stupidity, carelessness, poor judgment, possibly in a few cases, ignorance. No doubt in many cases the motorman shares the feeling of the average citizen that the railway company is a corporation and that it is a virtue of the highest order to inconvenience them or increase their operating expenses wherever possible. Whatever the reason may be, the fact remains that one who rides on the street cars and observes the conditions under which they are operated will daily see the motorman operating the car with the controller held stationary anywhere but in the regular running position. Where the most modern equipment has made this more difficult, there is still evidence on every hand that much more energy is being used than is necessary, that cars are run full speed where they might just as well coast and are brought to a sudden stop to the detriment of the equipment as well as to the inconvenience of the public. A man who rides on the street cars, habitually, was heard to remark the other day on the smooth running qualities of a certain motorman's car, which was so marked that he frequently delayed his trip home in the evening until this man rounded the corner.

An interesting article on the value of coasting recorders which have given gratifying results in a number of U. S. cities, prepared by J. E. Heberle, assistant secretary of the Capitol Traction Co. of Washington, appears in a recent issue of the "Electric Railway Journal." Mr. Heberle points out that next to the cost of labor, the highest item of expense in the operation of a street railway company, manufacturing its own power from steam is the coal bill. As the price of coal mounts, this item becomes more important. The article states that the first year's operation of his company with recorders resulted in an increase in their coasting percentage of about 15 per cent. and an estimated saving in fuel and brake shoes alone of $36,717, which represented the return of 78 per cent. of the original outlay for the recorders. Certain inducements were held out to the men to improve their coasting records and during October, 1919, an intensive coasting campaign was inaugurated which resulted in the coasting percentage being increased to 35 per cent. By May, of this year, this figure had been increased to 36 5 per cent This company have now 317 cars equipped with coasting recorders and the average number of motormen's records handled per day is 350. During the past twelve months a total saving of 3,803,517 kilowatt hours has been effected, which is calculated to have a fuel value of $33,717

"Safety" Car Reduces Number of Accidents—Toronto Buys Ten

Little by little the one-man "safety" car is winning its way. It has been clearly shown that the "Safety" reduces the cost of operation—up to fifty per cent. under the most favorable condiions. It has also been demonstrated that the number of accidents has been reduced. This is borne out by both Canadian and United States experience and, writing on this subject, the general manager of the Victoria, Australia, railway system states that: "One-man car operation, with passengers entering and leaving at the motorman's end, obviously leads to a reduction of accidents. There is frequently a weakness in the link between the conductor and motorman, and boarding or alighting accidents ensue. In our case the reduction of these platform accidents has been most marked; in fact, reduced to about one-eighth. What is very convincing is that the company insuring us against third-party claims, have reduced our premium four times, or a total of 40 per cent., since the introduction of one-man cars."

The province of Ontario will soon be in a position to give first hand knowledge of the operation of the "Safety" car, for it has just been announced that Toronto and St. Thomas will operate them in the near future. The city of Toronto has purchased ten cars for operation on the municipal lines where their introduction will be watched with interest. The objection originally raised by "labor" to these cars, on the score of unemployment, seems to have died a natural and very proper death.

Use of Electric Light Greatly Increases Egg Production

The Reliable Poultry Journal recently printed a letter from a private user of artificial light, from the Pacific Coast, indicating the good results obtainable, with extra light, in increasing egg production. The use of lighting has become increasingly popular among professional and amateur poultry men in Canada and though it can scarcely be said that the results obtained to date are entirely satisfactory, there have been such considerable results as to justify the continuance of the experiments. Below we print a letter reproduced from the Poultry Journal having special application to this question.

We started raising S. C. White Leghorns, February 14, 1916, and have always used lights, so we can give you no comparative data, but we are convinced that the difference between lights and no lights is the difference between success and failure.

"The first year we used gasoline lanterns on 360 February and March-hatched pullets, lighting them from October 1st to March 1st. That fall we had a good many molt, due to our inexperience in feeding. Our highest production for the year was in December, 1916—67 7%, for the month. The percentages of production were as follows: Nov., 54.2%; Dec., 67.7%; Jan., 1917, 64.2% Feb., 59 4%.

"In April a part of them went through a spring molt, lasting a short time, coming into a 64% production in June and July.

"The second year we used a hollow wire lighting system and found it very unsatisfactory, but by a deal of fussing we managed to keep lights going most of the time and our production for the winter months of 1917-1918 was as follows: Oct., 44 %; Nov., 68-1/3 %; Dec., 65%; Jan., 64%; Feb., 59-2/3%; a light molt in April and a 58% production in June and July. This was a flock of pullets hatched March 23rd.

"This year we have 650 pullets hatched as follows: 320 Feb. 22nd. 193 March 14th. 137 April 18th. In February, 1918, we installed an electric system and Oct. 1st, we turned on the lights at 6 00 a.m., turning them off at daylight, on again at dusk and off at 7.30 p m. This plan has been followed faithfully with practically no deviation ever since. We had no fall molt to speak of, only one bird molting enough to lose tail and body feathers while six lost only the neck feathers.

"The production for this winter's months was as follows: Oct., 52%; Nov., 64% Dec., 67%; Jan. (to present writing), 65%.

"Our birds are looking fine and have been laying since July 4th. They are hatched from our own trap-nested stock. Besides 620 pullets we have 400 breeders. We wished to make an early hatch, so Dec. 10th, as we were getting only about fifteen eggs per day from the breeders and we wanted 2500 in the machines Jan. 21st, we turned on the lights for an hour in the morning and until 6.30 in the evening. The following figures will show you the results:

Dec. 10, 15 eggs
Dec. 11. 8 eggs
Dec. 13, 15 eggs
Dec. 13, 13 eggs
Dec. 14, 12 eggs
Dec. 15 15 eggs
Dec. 16, 17 eggs
Dec. 17 17 eggs
Dec. 18, 15 eggs
Dec. 19, 30 eggs
Dec. 20, 35 eggs
Dec. 21, 29 eggs
Dec. 22, 81 eggs
Dec. 23, 127 eggs
Dec. 24, 139 eggs
Dec. 25, 143 eggs
Dec. 26, 195 eggs
Dec. 27, 215 eggs
Dec. 28, 208 eggs
Dec. 29, 217 eggs
Dec 30, 221 eggs
Dec. 31, 230 eggs

" When they reached 215 eggs on the 27th of December the lights were discontinued and have not been used since. To-night we tested forty-five eggs set under hens and found two infertiles and two doubtfuls, which we consider excellent Every one knows the price of eggs this winter compared with last summer, but regardless of high or low prices the person who can produce winter eggs has the advantage over the one who gets largest production in the summer.

"I want to state here that we have handled our flocks after the methods taught at the Western Washington Experiment Station, which, in our opinion, cannot be beaten."

Officers of the Street Railwaymen's Union recently signed the agreement with the Winnipeg Electric Railway Company, providing for a wage increase of approximately 10 per cent., as recommended by the Myers Conciliation Board. The agreement is for one year. As the award is retroactive to May 1, the men will receive back pay, aggregating $70,000.

A New Method of Electric Spot Welding

Description of Experiments Recently Successfully Carried Out on the Spot Welding of Tubes—A Difficult Problem Solved—A Big Saving in Time

By F. K. Dalton, B.A.Sc.

Commercial welding machines are designed for the welding together of metal sheets where the location of the weld is accessible from both the top and the bottom at the same time. An electrode from above presses down on the sheets to be joined and pinches them between itself and the electrode directly below it. A heavy alternating current is then turned on to heat the metal to the temperature of fusion and after being allowed to flow for a few seconds is turned off and the pressure removed. Thus the simple operation is quickly performed.

During the past few months, however, the writer has been working out a scheme whereby two pieces of tubing may be spot welded together successfully, the chief difficulty in this being that the location of the weld is accessible from one side only, namely: the outside of the tube, and is not accessible inside the tube. The problem then is to so direct the current through the metal that it effectively heats the point of contact, and to so adjust the pressure that it will be sufficient to insure a good spot but not so great that it will distort the shape of the tube.

Several experiments have been performed at various pressures and with different currents flowing, until a satisfactory result was obtained. A special lower electrode designed so that there would be no burning of the metal in touch with it, had to be fitted to an improvised spot welding machine.

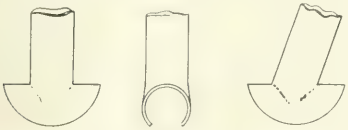


Fig. 1

The steel tubes on which experiments were conducted had an external diameter of five-eighths of an inch, the thickness of metal being about 1/32 inch. These were part of a product of a local manufacturer and were formed in dies to shapes as shown in Fig. 1. Previous to these experiments on spot welding the joints had been made by soldering but the results were not satisfactory in the matter of strength and instances of failure were frequently being brought to the attention of the manufacturer. This, naturally, was a decided hindrance to the sale of the product.

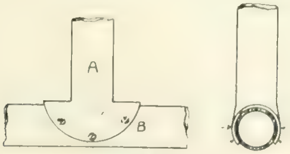


Fig 2

The part "A" (Fig. 2) is joined to a straight piece of tubing, there being on "A" a flange which closely fits the latter and nearly circumvents it. Three spot welds were made on each side as shown (Fig. 2, marked by arrows on end view). In the first experiments these welds caused slight indentations in the surface of the part "A". Later when finer adjustments were made these became merely a roughness on the surface and, after the final dipping in a thick aluminum paint, were not noticeable at all.

The operation of welding is quite simple and rapidly done. The copper part "C", Fig. 3, previously referred to, is the specially designed lower electrode. This is grooved at the top to allow the part "B" to fit in and make electrical contact over a comparatively large surface. The part "A" is mechanically fitted to part "B" in the exact location where it is desired to secure it and the upper electrode brought into contact with this part. The current is turned on for a few seconds and then off again before the upper electrode is lifted. Only one spot is made at a time, the complete joint requiring four or six spots according to the strength desired. In this case it was found that six spots (three on each side) gave a joint stronger than the material itself.

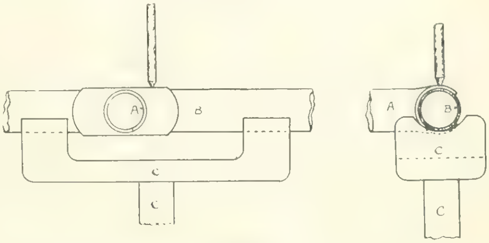


Fig. 3

In order then to determine the strength which one might expect to find in such a joint, three tests were performed. In the first test, (Fig. 4.) the tube "B" was placed on two rigid supports, the tube "A" was secured in a clamp and weights added, thereby applying forces the direction of which are shown by the arrows. In this position a force of 1200 pounds was applied to "A" before there was any sign of weakness. The spot welds did not part but with this force the metal was torn apart along the dotted line. (Fig. 4).

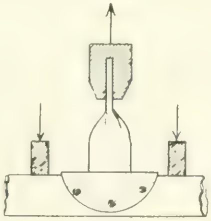


Fig. 4

The next test was an attempt to twist the part "A" off the part "B". Part "B" was securely fastened and a force applied to part "A" at a distance of 1¼ inches from the top of part "B." (Fig. 5). When this force reached 190 pounds none of the welds or the metal had shown weakness, but the part supporting "B" broke [illegible] ered unnecessary to repair it and use greater force. The bending moment or leverage was 5.1 foot pounds. The final test was made according to Fig. 6 with the force applied, as shown, about 1¼ inches above part "B." With a force of 550 pounds the end spot weld which was receiving nearly all the stress, parted. The leverage here was 5.7 foot pounds.

It is questionable whether the soldered joint, even at best, has one-half the strength of this welded joint There is also, in the soldered joint a certain brittleness, or tendency to break under shock, which is overcome in the welded joint.

In concluding, the following facts may be mentioned: the current required is 2300 amperes; the pressure about 7 pounds, and the time during which the current is allowed to flow is just one second. While the process of spot welding produces results which are stronger than soldering or riveting, it also very much lessens the time required for the operation. In this particular case quantity production was the object and approximately sixty per cent. in time was saved in this one operation.

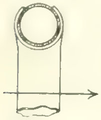


Fig 5

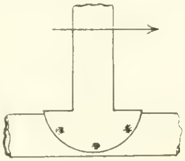


Fig. 6

The Electric Truck Industry—Some Interesting Unvarnished Facts Which Should be Known*

The object of this article is to present briefly a few important facts regarding the electric truck industry which should be known by every motor truck user especially, and by every business man generally.

First: "The Survival of the Fittest."

The electric truck industry has successfully passed through several years' competition with the gasoline truck industry—competition which probably has never been equalled in the world's industrial development, and which would have been fatal to electric trucks if they had not been an economic necessity in the transportation field.

Second: Why are Electric Trucks an Economic Necessity?

Simply because they operate much more economically and satisfactorily than any other type of motor truck when used within the mileage capacity of the batteries, which is now approximately forty to fifty miles per day, without exchanging batteries or "boosting" them during the idle noon hour.

Third: Who are the Principal Users of Electric Trucks?

The most successful companies in nearly all industries—those which keep complete and accurate trucking cost records, and invest in and operate their trucking equipment with the same care and skill that have successfully developed their other business.

Fourth: Why Did the Electric Truck Industry Not Grow at Same Rate as the Gasoline Truck Industry?

Because the enormous advertising and sales campaigns carried on for years by the gasoline passenger car and truck interests were not considered a permanently wise policy by the conservative financial interests controlling the electric truck industry, and also because electric truck sales efforts were confined to a few large cities where the entire production has been continuously purchased by truck "fleet" users of national prominence who know from their own records the unequalled economy of electric trucks.

Fifth: What Has Been the Result of the Artificial Stimulation of Gasoline Truck Sales?

The misapplication of gasoline trucks for certain work which electric trucks will do better and cheaper, and the consequent dead loss of millions of dollars annually in trucking costs.

Sixth. Why Is the Electric Truck Industry Growing Rapidly Now?

Because the ever-increasing cost of production and distribution has resulted in thorough investigation of trucking costs, and the consequent use of electric trucks for work within their capacity, and the use of gasoline trucks for work beyond the capacity of electric trucks.

In other words: **The proper application of the most economical machine for the work—or ordinary commercial common sense.**

Seventh: What Is the Present Situation?

Some of the oldest electric truck manufacturers are building large new factories to fill the ever-increasing demand, and other manufacturers are entering the field.

Eighth: What Caused Past Failures?

Precisely the same causes of most industrial failures: manufacturing obsolete types—poor management—or lack of adequate foresight, experience, ability or energy.

In a brief presented by the National Automobile Chamber of Commerce to Congress during the consideration of the Excise Tax Law in 1917, one of the points specified was—**"718 Automobile Manufacturers fail or retire from business in five years."**

Transportation Costs: Considered generally, the most economical means of commercial transportation is by boats —next by railroads—next by electric trucks—next by gasoline or horse trucks, which means that electric trucks are pre-eminently economical in trackless road transportation! (commonly called trucking).

Typical Trucking Cost Comparison: The complete accurate operating cost records of large users of both gasoline and electric trucks prove that a five-ton gasoline truck, operating an average of forty miles per day, costs approximately $5 to $10 per day more than a five-ton electric truck doing the same work.

Now, just figure $5 per day for ten years of 300 working days, and you will see that the user of a five-ton gasoline truck that is doing "electric truck work" is absolutely wasting $15,000 of good money that otherwise would assist in producing profit, or the reduction of the present high costs.

Now, consider the thousands of five-ton gasoline trucks operating in the United States that are doing electric truck work (beside the thousands of smaller sizes), and the annual wastage will astonish you.

At present the electric truck industry, although very successful, is too small to bear the burden of unlimited publicity and, of course, the gasoline truck interests are boosting their own business, so I earnestly suggest the maximum publicity possible by those who are not affiliated with opposing interests and who desire to do real constructive work for the good of every one of us.

---

* [illegible] N. E. L. A. [illegible]

Who First Suggested the Practical Application of Electricity to the Transmission of Messages?

In View of the Coming Convention of the Old Time Telegraphers and Historical Association Which is Being Held in Canada (Toronto) for the Second Time Since Its Organization in 1860, the Answer to the Above Question is of Unusual Interest—Charles Morrisons's Claim Set Forth

The following comments and correspondence relating to "Charles Morrison" and his connection with the transmission of messages by electricity, have been received with an accompanying communication from Mr. Arthur V. White. The letters as here produced tell their own story. In view of the Convention of Old Time Telegraphers, which meets in Toronto on Aug. 31 and Sept. 1, they carry an interesting message.

Editor, Electrical News:

Recently, when looking through some books, I found sandwiched amongst them some printed memoranda containing information relating to "Charles Morrison," crediting him with the pioneer idea of making practical application of electricity to the transmission of messages.

Not being familiar with the history of the art of the electrical transmission of messages, I do not know whether any novelty really attaches to these memoranda. They are, however, interesting, and if their contents are not generally known it occurred to me that the statements made would be of interest to your readers. It may be, of course, that all the printed memoranda just referred to have been reprinted from some other publication. However, the various items have been placed in sequence and are herewith transmitted to you for any purpose which may seem appropriate.

Yours, etc.,

ARTHUR V. WHITE

First Suggestion in 1753

Although the first steps in the invention of the telegraph were taken in France by M. Le Monnier, and in England by Sir W. Watson, about the year 1747, yet the idea of its practical application to the transmission of messages was undoubtedly first suggested by an anonymous correspondent of the Scots Magazine, dated Renfrew, Feb. 1, 1753, signed C. M., and entitled "An Expeditious Method of Conveying Intelligence." After a good deal of correspondence on the subject, Sir David Brewster gave up all hope of discovering the name of the inventor, and it was not till 1859 that he had the great pleasure of solving the mystery, in the following manner: he "received from Mr. Loudon of Port-Glasgow a letter, dated 31st Oct., 1859, stating that while reading the article in the North British Review his attention was arrested by the letter of C. M., and having mentioned the fact to Mr. Forman, a friend then living with him, he told him that he could solve the mystery regarding these initials. Mr. Forman recollects distinctly of having read a letter, dated 1750, and addressed by his grandfather, a farmer near Stirling, to Miss Margaret Wingate, residing at Craigengilte, near Denny (to whom he was subsequently married), referring to a gentleman in Renfrew of the name of Charles Morrison, who transmitted messages along wires by means of electricity, and who was a Native of Greenock, and bred a surgeon. Mr. Forman also states that he was connected with the tobacco trade in Glasgow—that he was regarded by the people in Renfrew as a sort of wizard, and that he was obliged, or found it convenient, to leave Renfrew and settle in Virginia, where he died. Mr. Forman also recollects of reading a letter in the handwriting of Charles Morrison, addressed to Mr. Forman his grandfather, and dated 25th Sept., 1752, giving an account of his experiments, and stating that he had sent an account of them to Sir Hans Sloane, the President of the Royal Society of London, who had encouraged him to perfect his experiments, and to whom he had promised to publish an account of what he had done. In this letter Mr. Morrison stated that, as he was likely to be ridiculed by many of his acquaintances, he would publish his paper in the Scots Magazine only with his initials."

The following is a copy of the paper referred to as published by Charles Morrison in the "Scots Magazine."

An Expeditious Method of Conveying Intelligence by Means of Electricity

Renfrew, Feb. 1, 1753.

To the author of the "Scots Magazine."

Sir,—It is well known to all those who are conversant with electrical experiments, that the electrical power may be propagated along a small wire, from one place to another, without being sensibly abated by the length of its progress. Let then a set of wires, equal in number to the letters of the alphabet, be extended horizontally between two given places parallel to one another, and each of them about an inch distant from that next to it. At every twenty yards end, let them be fixed in glass, or jeweler's cement, to some firm body, both to prevent them from touching the earth or any other non-electric, and from breaking by their own gravity. Let the electric gun barrel be placed at right angles with the extremities of the wires, and about an inch below them. Also let the wires be fixed on a solid piece of glass, at six inches from the end; and let that part of them which reaches from the glass to the machine, have sufficient spring and stiffness to recover its situation after having been brought in contact with the barrel. Close by the supporting glass, let a ball be suspended from every wire; and about a sixth or an eighth of an inch below the balls, place the letters of the alphabet, marked on bits of paper, or any other surface that may be light enough to rise to the electrified ball; and at the same time let it be so contrived, that each of them may reassume its proper place when dropt. All things constructed as above, and the minute previously fixed, I begin the conversation with my distant friend in this manner. Having set the electrical machine a-going as in ordinary experiments, suppose I am to pronounce the word **Sir;** with a piece of glass or any other **electric per se,** I strike the wire **S,** so as to bring it in contact with the barrel, then **i,** then **r,** then all in the same way; and my correspondent, almost in the same instant, observes these several characters rise in order to the electrified balls at his end of the wires. Thus I spell away as long as I think fit; and my correspondent, for the sake of memory, writes the characters as they rise, and may join and read them afterwards as often as he inclines. Upon a signal given, or from choice, I stop the machine; and taking up the pen in my turn, I write down whatever my friend at the other end strikes out.

---

*See, The Home Life of Sir David Brewster. Edinburgh.

If anybody should think this way tiresome, let him, instead of the balls, suspend a range of bells from the roof, equal in number to the letters of the alphabet; gradually decreasing in size from the bell **A** to **Z**: and from the horizontal wires, let there be another set reaching to the several bells; one, **vist.** from the horizontal wire **B** to the bell **B**, &c. Then let him who begins the discourse bring the wires in contact with the barrel, as before; and the electrical spark, breaking on bells of different size, will inform his correspondent by the sound, what wires have been touched. And thus, by some practice, they may come to understand the language of the chimes in whole words, without being put to the trouble of noting down every letter.

The same thing may be otherwise effected. Let the balls be suspended over the characters as before, but instead of bringing the ends of the horizontal wires in contact with the barrel, let a second set reach from the electrified cake, so as to be in contact with the horizontal ones; and let it be so contrived at the same time, that any of them may be removed from its corresponding horizontal by the slightest touch, and may bring itself into contact when left at liberty. This may be done by the help of a small spring and slider, or twenty other methods, which the least ingenuity will discover. In this way, the characters will always adhere to the ball, excepting when any one of the secondaries is removed from contact with its horizontal, and then the letter at the other end of the horizontal will immediately drop from its ball. But I mention this only by way of variety.

Some may perhaps think that although the electric fire has not been observed to diminish sensibly in its progress through any length of wire that had been tried hitherto; yet as that has never exceeded some thirty or forty yards, it may be reasonably supposed that in a greater length it would be remarkably diminished, and probably would be entirely drained off in a few miles by the surrounding air. To prevent the objection, and save longer argument, lay over the wires from one end to the other with a thin coat of jeweller's cement. This may be done for a trifle of additional expense; and as it is an **electric per se,** will effectually secure any part of the fire from mixing with the atmosphere. —I am, &c. C. M.

The communication sent by Mr. R. H. Loudon to Sir David Brewster on the 31st October, 1859, is as follows:

Port-Glasgow, 31st October, 1859.

Sir,

Having the other evening been reading a portion of the **North British Review,** vol. 22, P. 545, regarding the invention of the Electric Telegraph, and having by mere chance come upon the passage which says, "it was reserved for a Scotchman, a gentleman residing in Renfrew, to suggest the idea of transmitting messages by electricity along wires passing from one place to another. The remarkable proposal was published in the **Scots Magazine** for February, 1753, in an article bearing the initials, 'C.M.', **the only name which we shall ever probably obtain** for the first inventor of the Electric Telegraph."—a friend of mine at present living with me here, on being shown the passage, and thinking for a minute, told me he could solve the mystery regarding the gentleman in question, with the view of sending the same to you, presuming that you were the writer of the article referred to, or connected with the publishing of the North British Review. He stated that in a letter which his Great Grandfather had written to Margaret Wingate, Craigengilte, near Denny, in the year, 1752, which letter he recollects having seen, and which he believes is still in preservation, his Great Grandfather describes a gentleman in Renfrew, of the name of Charles Morrison, who was a native of Greenock, and was bred a surgeon, but it is a question whether he ever practised his profession, as it was known that he was sometime connected with the Tobacco Trade in Glasgow. It is presumed he had not continued very long at the business of dealing in tobacco, but had made the study of finding out this noble science his daily theme. The people of that age were so superstitious that they believed Mr. Morrison was crazy, and that the Devil was acting in concert with him, and my friend's grandfather, and grandmother also, thought so, and all who heard or saw him transmitting intelligence along wires by invisible means, were actually persuaded that the man was assisted by some supernatural being. From what my friend can remember of hearing, it is thought that Mr. Morrison had to leave Renfrew, in consequence of the superstitious notions of the age. Mr. Morrison did leave Renfrew whether from this cause or not he cannot affirm, and went to Virginia, U.S., where he afterwards died.

My friend remembers perfectly well when a boy of his grandfather coming to his father's house, and telling all sorts of stories about the gentleman in Renfrew, who could transmit messages along wires, and what the general opinion was regarding him. The subject being new and interesting caused him to listen to it with greater attention, and this is the reason he says why he recollects so well about Mr. M. at the present day.

Perhaps I am only troubling you with this long epistle of no use, as you may have ere now obtained from some one else a better history of Mr. M.'s pedigree.

My friend advised me to send the above information as an article for publication in the Newspapers, but I had thought it would be better to send the same first to you, and probably you might inform me if you had not already been favored with the intelligence, and advise whether you would wish to publish the same yourself.

If you desire any further particulars regarding Mr. Morrison, I shall be happy to be at your service, and endeavour to obtain anything you may suggest.

I have the honor to be, Sir.

Your most obedient faithful humble servant,

R. H. LOUDAN,

At Alex. Lade, Esqr.'s.

Answered Nov. 2, 1859. (Jotting by Sir David Brewster).
Wrote again, Jan. 2, 1860. (Jotting by Sir David Brewster).

Mr. Loudon's communication to Sir David of the 4th. January, 1860, is as follows:

Port-Glasgow, 4th January, 1860.

Sir D. Brewster, St. Andrews,

Sir,

I have to acknowledge receipt of your letter of the 2nd instant, and, in answer, beg to state that my friend, Mr. Forman, has been endeavoring to get the letter written by his Grandfather, but as yet he has not been successful. It appears the above letter, among others, are in the custody of an Aunt, who lives in a small village in Perthshire. He wrote her about the middle of November last to make a search for the letter, and to send it, or a copy thereof, but she wrote back saying she had not been able to find it Mr. Forman then stated that he would, perhaps, go and pay her a visit about the New Year, when he would make a search himself, but circumstances having prevented him from going, nothing farther has been done. He has again written to-day to his Aunt to renew her search, as it is possible she being an old woman might not know it, although she laid her hands on it. For these reasons, I have delayed writing you in answer to yours of the 2nd November. So soon as a reply comes, I shall again write you, either with the letter or the statement*you refer to. I would like very much if the letter could be got, as it would at once settle a matter of great importance to Scotland.

I am,
Yours respectfully,
R. H. LOUDAN

Mr. Loudon's communication to Sir David of the 30th, January, 1860, accompanied by the letter from Mr. D. W. Forman, is as follows:

Port Glasgow, 30th January,1860.
Sir David Brewster, St. Andrews,
Sir,

In reference to my letter of the 4th instant, I now beg to send you annexed a statement by my friend, Mr. Forman, regarding Mr. Charles Morrison. So far as he recollects he can vouch for the truth of what is therein contained. I am sorry he has not been able to get either of the letters therein referred to. His Aunt being a very old and frail person, and not considering the importance of the letters, I suppose cannot be fashed to make a search for them. Mr. F. has written her twice, and the only answer he has got was that she had not been very well, and if he wanted the letters in question, he should come himself and look for them. He says that she looks upon all the old papers and books as great relics, and would not part or lend any of them to any one upon any account whatever.

My friend has not the means, I know, else I believe he would go himself, as he appears very anxious that the matter should be solved. He says that he hopes we won't be beat, as he intends ere long of going himself, and making a search if the annexed does not suffice. Trusting that the annexed particulars may answer the object you have in view in the meantime,

I am, Sir,
Yours respectfully,
R. H. LOUDAN.

In answer to your enquiries respecting Charles Morrison, I now beg to inform you that I recollect of having seen a letter about 30 years ago addressed by my great grandfather, Mr. Forman, farmer, Blackdubb, near Stirling, in Perthshire, to Miss Margaret Wingate, residing at Craigengilte, near Denny (to whom he was subsequently married) and which I now fully believe was dated in 1750 instead of 1752, as I lately stated to you, referring to a gentleman in Renfrew, who transmitted messages along wires short distances by means of electricity. His letter gave the gentleman's name as Charles Morrison, and described him as being a very bashful and eccentric individual, a native of Greenock, and bred a surgeon. I also recollect of having seen and read a letter in the handwriting of this same Charles Morrison (it being signed by him), addressed to Mr. Forman, dated 25th September, 1752, giving a detail of his experiments in sending messages along wires by means of electricity, and stating that he had sent a description of the same to Sir Hans Sloan in London, by whom he was encouraged to perfect his experiments, and that he intended giving him a more detailed account in the following year, 1753, when he hoped also to be able to publish a minute narration thereof in the "Scots Magazine." His letter also stated Sir Hans Sloan at that time was an aged man, and very frail, and that it would probably be about the month of May, 1753, before he could comply with the requirements of Sir Hans; but Mr. Morrison appears to have been able to comply sooner than he expected, as the letter is dated February in the "Scots Magazine." It also stated that he was likely to be ridiculed by many of his own acquaintances and as it was a thing the great world cared little about, he would only publish his initials. What causes me to recollect the date, 25th September, of the above letter at this day is, that I was born on that day and month.

I forgot to say that there are descendents of Margaret Wingate above referred to, of that name, who are shawl manufacturers in Glasgow, and I have no doubt if they were communicated with they might in some way or another verify the truth of the above statements.

D. W. FORMAN.

Professor Dorsey's Invention in the Experimental Stage—Does Not Favor Publicity at Present

A number of statements have appeared in the daily press recently regarding a new invention of Professor J. W. Dorsey, of Winnipeg University. It is claimed by Professor Dorsey that by an improved system of installation and transmission, he can effect very considerable improvement over the present standard practices. To date the matter is admittedly in the experimental stage, but Professor Dorsey hopes in the near future to be able to form a company that will provide sufficient capital to demonstrate whether his invention is commercially feasible. The following letter regarding the possibility of Professor Dorsey's scheme has just been received:

Winnipeg, Aug. 1/20.

Editor "Electrical News":

The power on the Winnipeg River is sufficient to heat the people of Winnipeg in the most extreme winter. Engineers, generally, will not admit the truth of this statement at present. This fact, however, is most significant especially in view of the coal situation for 1920-21.

By means of the utilization of power developed on the Winnipeg River it is thus possible to save millions of dollars on the importation of coal from the United States for heating purposes. There is sufficient power available to heat every person in Winnipeg twenty-four hours a day if the temperature remained forty degrees below zero for the entire year.

This heating question is the most important industrial problem that faces Canada, particularly as it affects the development and exploitation of the Northern area of this country.

It is easier and cheaper to transmit water power eighty miles electrically than it is to transport coal 1,400 from Pennsylvania, especially when there is a scarcity of rail transportation.

To obtain the above results it is necessary to take every advantage of the efficient utilization of electricity. My method and system does not require a reduction in the power rate, though a reduction might follow from the more general use of electric power for all purposes.

If Canada expects to cope with the disadvantageous exchange situation she must make every effort to utilize her own resources rather than to depend on those of the United States. The latter method is too greatly employed at present. The problem of heating electrically is one important instance in which Canada should lead the United States. Until she solves this problem she is economically dependent on the country to the South in an extreme degree.

Yours truly,
J. W. DORSEY.

Problems in Ornamental Street Lighting

Some Practical Suggestions on Proper Methods of Installation—Financing—Use Diffusing Glassware to Prevent Glare—Proper Lighting Great Assistance in Making the "City Beautiful"

By L. A. S. Wood*

The term "Whiteway" has been used extensively in connection with ornamental street lighting and has been the cause of considerable misapprehension on the part of the public as to the purpose of ornamental street lighting.

An ornamental street lighting system should be considered as part of a scheme for beautifying the city as a whole and not as a means of advertising one section of a city perhaps to the detriment of some other locality.

In the early days of electric street lighting the average intensity of the illumination on our streets was low, in fact very much lower than was customary in Europe and progressive business men took steps to improve this condition by installing whiteways along the streets adjacent to their property. This led to the installation of a poly-glot collection of lighting units of different types, some in operation and others derelict so that the whiteway instead of being a thing of beauty often became an eyesore until it was removed or merged into a general scheme of ornamental street lighting.

In recent years the intensity of illumination on our streets has been materially increased and the necessity for brilliant lighting in individual localities has disappeared. An appreciation of this condition will help us in solving our problems in connection with ornamental street lighting because it opens the way to the proper financing of the installation and the maintenance of the system when completed.

The cost of the installation of an ornamental street lighting system might very well be borne by the property owners on the street where the ornamental system is to be installed but the maintenance of such a system should be borne by the city as a whole.

The most satisfactory way of financing an ornamental street lighting system is for an improvement district to be created and the adjacent property owners assessed on a front foot basis in the same way as they would be assessed for any other municipal improvement. In general the expense to the property owner for the complete installation under a scheme of this character is very low, usually not more than $1.50 per front foot, while the cost to the individual citizen for maintenance of the improved system from which he receives material benefit is negligible.

It is thought that the central station should discourage the indiscriminate installation of ornamental posts outside business premises and all suggestions for "Whiteways" should be subject to careful consideration and consultation with the city authorities before the central station takes an active part in their promotion. Whiteways should always be considered in connection with the "City Beautiful" idea and in the light of ornamental systems benefiting the city as a whole rather than as a means of advertising some particular locality.

It is of the utmost importance that the ornamental lighting system shall be in keeping with its surroundings and so designed as to give the maximum amount of illumination with a minimum of glare. Too often this point is overlooked with the result that the whole system is spoiled by the use of incorrect glassware.

The manufacturers of ornamental street lighting devices may with advantage be consulted and their suggestions given very serious consideration before any ornamental system is designed, for some of the manufacturers of this class of apparatus have collected valuable data on the subject which is at the service of any city interested in the proposition.

The central station is particularly interested in the maintenance of ornamental lighting systems and in general from the central station standpoint as well as from the city's a series system is usually the best to adopt and if lamp renewals are covered by the maintenance contract the central station will find that the moving coil regulating transformer will give the best results owing to its perfect regulation under all conditions.

The ease with which a series system may be controlled and extended render it particularly suitable from a central station standpoint.

There has been some difference in opinion as to the relative advantages of a conduit system versus "Parkway" or steel armoured cable but the general concensus of opinion is in favor of the latter.

The argument in favor of the conduit system is the ease with which damaged cable may be withdrawn from the conduit but if the installation is properly made this should not be necessary except in the unlikely event of the cable being subjected to mechanical injury in which case the location of the fault is a comparatively easy matter.

Steel armored lead covered cable should be laid in a shallow trench below the curb or in the "Parkway," if any, and in this position it is not likely to be damaged. It is important that ends of the cable where cut should not be exposed to the weather. We are all familiar with the precautions taken by cable manufacturers to seal the ends of the cable before it leaves the factory but unfortunately very little care is exercised in this direction when the cable is installed. It is quite common during the installation of ornamental lighting systems to see the ends of the underground cable projecting through the ground exposed to all weathers until the posts are installed and connected, with the result that faults are likely to develop at an early date and the installation becomes a source of trouble and expense.

The best way to instal armored cable is to lay it in a prepared trench leaving a loop at the location of each post sufficiently long to reach the terminal of the disconnecting device in the base of the post and to pour cement around the loop to form the foundation for the post. This is a more satisfactory method than the one usually used of making the post foundations first with the conduit elbows for the cable to be drawn through as it leaves the cable intact until the time the connections are made in the base of the post.

A disconnecting pothead should be used in the base of the post and this should be of such design as to thoroughly seal the ends of the steel armoured cable and efficiently bond and ground the steel armour and lead covers. It should also be designed so that the post wiring is automatically disconnected from the underground system and the circuit in base of post re-established by a short circuiting device in the event of the post being accidentally broken.

It is desirable that a device be used in the top of the post for relieving the terminals of the lamp socket from the strain of the weight of the cable used in wiring the post.

---

*[illegible] & [illegible]

There is considerable difference of opinion among engineers as to the best type of glassware for street lighting units but the general concensus of opinion is in favor of diffusing glassware for ornamental units owing to the practical elimination of glare with this type of glass.

Glare within the range of vision of the pedestrian or vehicle driver should always be avoided. It causes the pupil of the eye to contract in an effort to protect the delicate mechanism of the retina, thus preventing the observer from seeing as well as he would be able to do with a light source of lower intensity but more perfect diffusion. We are conscious of this phenomenon when entering a moving picture theatre from a street flooded with sunlight—at first no details can be seen but gradually when the eye becomes accustomed to the light, or in other words when the pupil becomes dilated permitting more light to enter the eye, the interior details become visible.

Although during the war there were few developments in street lighting units there has been great activity in this direction since the armistice and we may look for many new devices in the near future which will materially assist us in our efforts in making the "City Beautiful" as accomplished fact in so far as the lighting of our streets is concerned.

Bringing Together the Four Factors—Central Station, Jobber, Dealer and Contractor

A report presented before a recent N. E. L. A. convention on the subject of advertising and publicity contained an interesting paper on "The Co-operative Idea." This paper deals with:

(a) The importance of newspaper advertising in the electrical field;

(b) The co-operative idea, its strength

(c) How to bring together the four electrical factors —central station, jobber, dealer, and contractor;

(d) The difficulty in these days of heavy advertising to enlist the interest of newspaper men without organized space buying.

The most effective means to create interest in and a demand for merchandise is through newspaper advertising.

It is estimated that half of all the money spent by merchants for all kinds of advertising including circulars and printed matter, is spent with newspapers. Usually the amount is a definite percentage of the estimated volume of business.

John Wanamaker is credited with saying, "If I ever have a monument for discovering anything, it will be for finding out that the only advertising of direct and instant benefit to both merchant and consumer is in the daily newspaper circulation."

In the same way that the local merchant covers his own community through newspaper advertising, so the national advertiser, who employs newspaper space, covers the list of localities in which he is doing business. The newspaper links together the stories told by the merchants and the manufacturer in their advertising space, and where these advertisements are carried in co-operative pages, presents to the consuming public a most forceful appeal.

In the merchandising of electrical goods, four parties must be considered, namely, the consumer, the dealer, the manufacturer and the central station. If the advertising of the latter three can be grouped together they will create a demand by the consumer for electrical goods far in excess of that created through individual effort, and if, in addition to group advertising, interesting news items on electrical subjects are printed on the same page, as typified in the so-called electrical pages, maximum results are assured.

The habit of advertising in newspapers is at this time probably well fixed in the mind of the central station advertising manager, but it is pertinent to point out to him the opportunity he has to interest the manufacturer and dealer in local advertising, to point out the readiness of the local newspaper to aid in securing electrical advertising, and to urge upon him the promotion of a definite co-operative newspaper advertising plan.

Central stations as a rule contract for a certain amount of space in newspapers to be carried at regular intervals. In some instances careful thought is given to the wording and appearance of the copy. Many of the local dealers advertise more or less infrequent intervals, and occasionally a manufacturer runs an ad for the benefit of his local jobber. But the unsupported advertisements of the central station or manufacturer do not yield the maximum results. For each to realize the full worth of its or his individual space, the supporting advertising of all the dealers in electricity translating devices must be secured. How is this to be obtained. Obviously some agency must push the idea, must prove to the central station, manufacturer, dealer and newspaper company the multiplied effect on the public mind of simultaneous advertising.

What then is the natural agency to bring the minds of these four groups together? Perhaps in various localities any one of these groups may take the lead, or it may be none of these, but may be a local electrical league, or perhaps an outside agency, such as the Society for Electrical Development.

Whichever it is, someone personally imbued with the idea of co-operative advertising, someone who knows how to advertise, knows the value of advertising and the value of co-operative advertising, has to create the plan in each community, has to sell the idea to each group and has to push the campaign with vigor until the volume of newspaper space lined up together becomes sufficiently large to assure a permanent undertaking.

At the present time merchants, generally, except those in the electrical field, are advertising so freely that newspapers frequently decline to accept copy on heavy days. If Thursday is a heavy issue, for instance, the advertiser may be required to run Wednesday or not at all. Under conditions like these, newspapers are naturally not so keen for electrical advertising unless it is easy to get; they can spend their energy among the merchants to better advantage. In the interest of electrical advertising, therefore, it is advisable that electrical advertisers be organized and offer the newspapers bulk copy.

To obtain the maximum results of advertising, someone in every community possessed of that vital energy, that spirit of doing the thing, must grasp the idea, plan the campaign, and sell it to the central station, manufacturer, dealer and newspaper. The details may vary; the campaign may take the form of more advertising; it may be electrical pages with electrical news write-ups; or it may be co-operative advertising in connection with special selling campaigns.

Where the central station confines its selling efforts to the sale of electrical current only and does not enter into competition with the dealers, naturally the plan is simplified and made easier, and the co-operative field unlimited.

The Netherlands Canadian Flax Co., Teulon, Man., are building a power house.

Providing Electric Service for the Farmer

How They Do It in Certain Parts of the United States —By A. W. Jones, Secretary-Manager Peterson (Iowa) Power & Milling Company, in "Electrical World"

In 1913 the first transmission line of the Peterson (Iowa) Power & Milling Company was built to connect up a town about ten miles distant. On this line the company first tried out a plan for supplying farmers with electric service. Six farm customers were connected to this line and were taken under contracts very much the same except for price as the company's contracts for today. This would seem to indicate that if the company's farm policy is faulty we have failed to find it out in six years of practice, during which time we have built transmission lines to serve fourteen towns and on these and other farm lines in four counties we have hundreds of farm customers.

From knowledge of general farm conditions throughout Iowa and our experience in giving electric service to the farmers for six years, I know that they can well afford such installations as are necessary to make available central-station service, and the cost of the service after the installation is made is not burdensome. The added improvement and convenience meet the general requirements for more economical operation and better conditions on the farm. After a few months' experience with electricity for light and power it is considered a necessity and is highly recommended by almost every patron. Electric service for the farmer is a mutual business, and any inequitable arrangement either in the rates for service or the regulations imposed by the central station for the installation or the use of equipment will not work out to the advantage of either the producer or the customer.

A reasonably high minimum charge is necessary where farm customers are metered individually on the low side of the transformer. This regulation is necessary to offset line and transformer losses, and it obligates the consumer to use a liberal amount of energy. In justice to the consumer the kilowatt-hour rate must be low enough to make it practicable for him to use a good share of this service for power. These two conditions must be met if the company and the customer are to be satisfied.

If the representative of the power company negotiating for farm-line extensions bears a good business reputation, it is easy to get the farmer to sign a contract detrimental to his own interest, as the subject of electricity is decidedly foreign to him. He commonly admits that he knows nothing about it and is leaving the whole matter to the company. This is all the more reason why the power company, in building business for the future, should be extremely careful in making long-term contracts.

On our main transmission lines we charge a stipulated price for connection on the line, and the farmer pays for all the equipment leading from the transmission line, which is owned and maintained by the farmers. The meters are owned jointly by the power company and the farmer. Our reason for this is that the meters are read infrequently, and in case a meter becomes inaccurate it is much easier to reach an equitable settlement when the equipment belongs to both parties and the blame for not taking proper care of the equipment cannot be placed wholly upon either party.

We limit farm installations to 5 kv. a. transformers on the theory that all the continuous power required on a farm [illegible] running a large corn sheller, shredding corn, filling silos or threshing grain requires the use of a motor for such a few days in a year that the farmer is not warranted in making the costly installation and buying a high-priced motor for these few days' work, nor can the power company afford to take the losses in order to sell this additional energy, which, compared to a year's business, is small.

I am convinced that a low minimum charge and high-priced energy is ruinous business. In almost every case it is very unsatisfactory to both the producer and the consumer. The power company, while getting a high rate for energy, sells such a small amount that the percentage of loss is high enough to make the net receipts for such service entirely too low. At the same time the farmer cannot afford to use the service for anything but lighting and fractional-horsepower motors, and he too is dissatisfied because his ordinary power requirements are not taken care of, as he had anticipated they would be.

Approximately two-thirds of the energy used by the farm customers is for day load. Every farmer who is enterprising enough to make an electric installation has plenty of work that can be done profitably by electricity. Obligate the customer under the minimum charge to instal motors in order to use up his allowance under the minimum charge and he will soon use much in excess of this fixed amount, which makes it possible to give a comparatively low rate.

Answers to Practical Questions

In making proposals to farmers who contemplate building a new line a number of practical questions must be taken into consideration. Briefly, our experience has been as follows:

(1) At present prices a single-phase, 2,300-volt line with thirty-six 25 ft. poles per mile costs about $600. The same line using No. 6 copper, 6,600-volt, will cost $650. A single-phase line operating at 6,600 volts with No. 6 copper on twenty-eight 30-ft. (9-m.) poles per mile costs $675.

(2) We have the farmers sign a joint construction contract, specifying the price per mile for building the line and making the contract binding upon them when enough signers are obtained so that the cost will not exceed an agreed amount, say around $250 to $300 apiece. This allows the power company to carry the extension as far as it can, or cares to, and stop when it wishes.

(3) I prefer No. 6 copper-wire 6,600-volt main lines with No. 8 copper spurs. This voltage is easy to reduce and lightning protection is inexpensive, yet the line will carry a good load, which it will need to do if in a good section of country.

(4) Our terms of payment for line construction are 50 per cent. when the contract is signed and the balance when the line is energized.

(5) The construction contract is signed jointly as a co-partnership by all the farmers on a proposed line, but the clause limiting the cost to each signer to a specified amount protects each customer and removes the ordinary co-partnership objection as to liability.

(6) We own only the main lines. The farmers pay for

all the farm lines and turn the mains over to us. It is well to own the main feeders because that gives the central station a good hold on the business.

(7) We supervise and keep up all the farm lines, assuming no responsibility beyond the sections of line we own. We charge the cost of supervision and maintenance of farmers' lines to the various co-partnerships, prorate the charge and collect each year from the individual customers.

(8) We assume responsibility for the lines we own only.

(9) The central station must give good service, as a farmer will want some assurance that after he has spent $600 to $800 for an electric installation he will get service that will meet his requirements. He is entitled to this.

(10) Our present contracts for 3-kw. installations are being made at $50 a year for 425 kw. hr. used within the year and 8 cents per kilowatt-hour for energy in excess of this amount, or $60 for 525 kw. hr. and 8 cents per kilowatt-hour for excess when a 5 kv. a. transformer is used.

(11) Most of our contracts run for twenty years.

(12) Customers are obliged to pay for service during the full life of the contract unless this obligation is met by their successors.

(13) We read meters once each year, but they should be checked up two or three times a year.

(14) Customers with a $50 minimum pay $12.50 per quarter in advance, and customers with the $60 minimum pay $15 per quarter in advance; and all pay for energy used in excess of the amount covered by the minimum charge at the end of each year.

(15) Coal clauses I consider a good arrangement especially if all-steam power is used.

(16) Transformers on which the power company takes the loss should meet its approval; also, all energy-consuming devices should be installed subject to the approval of the power company.

(17) Each customer should own the transformer and sub-station equipment used for his own service.

(18) We limit transformers to 5 kv. a. rating, and we find that 95 per cent. of our farm installations are 3 kv. a. transformers. Rightly arranged, a 3-h.p. motor will do all the work required on almost any farm.

(19) A clause permitting future reasonable additions to the contract affords a good place to provide for something you may overlook.

(20) Keep within your jurisdiction questions of further extensions.

(21) The only farm equipment that gives trouble of any consequence is the transformer fuses. Sometimes during a severe electric storm many fuses on the farm installations will burn out, and with many customers out of service and bad roads this is a source of much trouble. We have overcome this difficulty by the use of a sub-station equipment of our own design, which, in addition to horn-gap lightning arresters and choke coils, has a removable fused switch blade. Using a 12-ft. light-weight weatherproof pole with a special spring finger on the end, the customer can stand on wet ground with safety and remove the switch blade, re-fuse it and replace it in less than five minutes. Since the installation of these fused switches two years ago we have heard nothing from farm customers about fuses. With hundreds of customers this is an important question.

(22) We write liability insurance for our farm customers by an indorsement on our policy, and charge each customer enough to pay this cost. The minimum premium for such an indorsement is $100 per year. The cost to farm customers for this is $1 per year.

The Electric Propulsion of Ships

Comparative Figures on Steam-Electric and Diesel-Electric Drive

The creation of an electrically propelled navy and the proposal to create an electrically propelled merchant marine is arousing widespread interest among technical men. There are two forms of electric drive now being used on vessels; steam electric drive, and Diesel electric drive.

About ten years ago the United States navy found that it had to pass upon the comparative merits of three different methods of ship propulsion, and in order to obtain reliable data on the subject, built three colliers, all alike except for their propelling machinery. They were; the Jupiter, with steam electric drive; the Neptune with geared turbines; and the Cyclops, with reciprocating engines.

These ships were put into commission about 1914 and after a very careful study of their performance it was decided that all capital ships—battleships and battle-cruisers—should be propelled by the steam-electric system, while colliers, destroyers, scout cruisers, transports and other classes, should be equipped with geared turbines.

The present U.S. naval program includes twelve battleships and six battle-cruisers, all to be propelled by the steam electric system. Of these, two have been completed; the New Mexico which went into commission in 1918 and the Tennessee, which was placed in commission recently.

The Advantages of Steam-Electric Drive

The great advantage of the electric drive for ships, is that the engines are not mechanically connected with the propellers. With all other types of drives, the engines and the propeller shaft form a fundamental element of the ship's design and the ship must, in fact, be built around them. But with an electric ship, the designer has much greater freedom and he can place the engines almost anywhere he desires. The importance of this fact from a military standpoint is obvious. Steam-electric drive is, therefore ideal for capital ships and also, for about the same reasons, for express steamers.

The Diesel-Electric Drive

This is a very recent development and there are to-day but two U.S. vessels using it, the yacht, "Elfay" and the trawler, "Mariner." The "Elfay" is a schooner of 313 gross tons, and employs Diesel-electric drive as an auxiliary to her sails. Her main engine is a six-cylinder Winton full-Diesel oil engine, which runs at 425 rpm. and is directly connected to a 75-kilowatt, direct-current, 125-volt Westinghouse generator. Power from this generator is supplied to a 90-horsepower Westinghouse motor which is directly connected to the propeller.

This equipment is operated and controlled directly by the navigator. Once the engine is up to speed, the engineer has nothing further to do except to keep it running properly. On the deck, just forward of the wheel, is a handle mounted on a pedestal. By turning this handle to the left, the propeller is started and brought gradually up to full speed in a series of several steps. When the handle is turned back to the off position, the propeller stops; and by turning the handle around to the right, the propeller is reversed in a similar manner. The full speed of the yacht under power is 8½ knots, and the rotation of the propeller can be changed from full speed ahead to full speed astern in less than five seconds.

Among the advantages of the Diesel-electric drive are flexibility of arrangement, ease of control, and exceptionally manoeuvering power; but its great advantage is its high fuel economy, for the internal-combustion oil engine can produce a given amount of power on from one-half to two-thirds less fuel than any form of steam engine. This represents a saving of such great importance that this type of drive will undoubtedly be widely used within its field of application.

As applied to the ordinary commercial vessel, there will usually be two or more engine-driven generators, so that the ship can proceed even if part of its propelling machinery is out of commission for any reason.

Steam-Electric and Diesel-Electric Drives Compared

The difference between the two electrical systems can be understood from the following table.

	Oil-Electric	Steam-Electric
Engine	Internal combustion oil-engine	Steam turbine
Engine speed	Under 500 r.p.m.	Above 1000 r.p.m.
Minimum fuel consumption per shaft horsepower	0.45 lbs. oil per hour	1.0 lb. per hour
Kind of current generated	Direct	Alternating
Voltage	Under 600 volts	Over 1000 volts
Maximum power	[illegible] to 4000 hp.	Undetermined
Special advantages	High fuel economy Flexibility of design	Unlimited power Flexibility of design.

The Diesel-electric drive is characterized by an engine of comparatively slow speed driving a low-voltage direct-current generator. The amount of power that can be generated by this method is limited, because when a certain point is reached, prohibitively large cables would be needed to carry the heavy, low-voltage currents, and the currents could not be handled by the commutators of the direct current motors. Hence, oil-electric drive, unless developed along new lines, will be confined to vessels of small or moderate size. But in this field it appears to have no competitor.

On the other hand, the steam-electric drive, which employs high-speed turbines and generators and supplies alternating current at comparatively high voltage, can probably furnish sufficient power for any ship that will ever be built. But whether it will ever be used on other than capital naval vessels and express steamers is still an open question.

It is superior to the reciprocating engine in matters of fuel economy, higher weight, and greater compactness per horse-power, but in these particulars it is somewhat inferior to the geared turbine, which is in addition obviously simpler and more easily handled by the average marine engineer.

Hence: for small and moderate sized ships, the Diesel-electric drive seems certain to be generally adopted because of its high fuel economy. For battleships, passenger liners and other vessels of great power where safety is paramount, the steam-electric drive is supreme. Between these two extremes is a large gap, and this gap at present seems destined to be filled by the geared turbine.

The Westinghouse Electric and Manufacturing Company is distributing miniature catalogue 9-A-2, which describes Industrial Heating Apparatus. Among the devices mentioned in this catalogue are, electric outdoor service foot-warmers, water heating devices, immersion heaters, elecerically heated hot tables, industrial heating plates, dry type glue pots, soldering pots, etc.

Coasting Recorders on Electric Street Cars

Very Important Economics Effected When Motormen Increase Their Coasting Records to Over Thirty-six Per Cent.—Other Benefits Follow

NEXT to the cost of labor, the largest item of expense in the operation of a street railway company manufacturing its own power is the coal bill. Railways that purchase their power find this cost reflected in their power costs. With the constantly mounting price of coal, the importance of using every measure of economy is emphasized. One field of economy that deserves the attention of every railway man and that has been entered by a number of roads is the conservation of power through the installation of some one of the various forms of checking devices on the cars, recording or indicating the performance of each motorman, and accomplishing its purpose by a thorough follow-up system, including the introduction of trainmen in the most efficient and economical operation of their cars.

TABLE I.

	Per Cent		Per Cent
[illegible] 1919	[illegible]	December	32.1
[illegible]	[illegible]	January, 1920	32.1
[illegible]	[illegible]	February	31.8
[illegible]	[illegible]	March	35.0
October	30.5	April	35.7
[illegible]	[illegible]	May	36.5

In 1919 the Capital Traction Company entered the ranks of companies which have adopted this measure as a means of increasing efficiency, and it is with the thought that our experience may be of interest and possible benefit to the industry at large that this article is written.

The necessity of conserving coal, both as a patriotic measure during the war and as a means of economy, was recognized, and in 1918 an order was placed with the Railway Improvement Company for coasting recorders to equip all of our cars. The skip-stop system had been instituted in April, 1918, on the railway lines in the District of Columbia, and in August our schedules were revised and tightened up to absorb the slack occasioned by the new stop system. The coasting recorders were installed in the spring of 1919 and the entire system was equipped by June 1.

Briefly stated, our first year's operation with the recorders resulted in an increase in our coasting percentage of about 15 per cent and an estimated saving in fuel and brake shoes alone of $36,717. This saving was accomplished with an investment of $38,852 and an expense of $7,913, giving a net return in twelve months of $28,804, or 78 per cent. of the outlay for recorders. At present our net saving in coal and brake shoes is approximately $3,600 per month. Other benefits accruing are touched on later.

Improvement in Coasting

Our first week of operation with the recorders showed a coasting average for the system of 26.4 per cent. This was after the initial instruction and after several lines had been operating with the recorders for from two to three weeks. From the first few days' performance of each division we estimate that our coasting percentage prior to the recorder installation was approximately 20 per cent. The system coasting percentages for each month from June, 1919, to May, 1920, inclusive were as shown in Table 1.

The building up of our coasting to 30 per cent offered no particular difficulties, the issuing of general instructions, posting weekly and monthly lists at the division barns showing the individual coasting records and periodic visits of the coasting instructor readily bringing this percentage. It required strenuous measures to reach a higher mark. Starting with the last week of October, 1919, an intensive coasting campaign was inaugurated, with 35 per cent. set as the goal. Coasting was "sold" to every member of the transportation department, and the aid of the mechanical department was enlisted to see that the cars were maintained in good rolling condition. Our motormen so entered into the spirit of the campaign that they reached the coveted 35 per cent in March, 1920, increasing this to 36.5 per cent in May.

The individual records in the early period showed a vast range, some motormen having records as low as 8 per cent. A surprising feature was that many of the low records were turned in by men who in all other respects were excellent motormen. An idea of the improvement in this respect may be gained from Table II., showing the number of our men with various coasting percentages during the week ended June 7, 1919, and the last week of May, 1920:

Table II.

Motormen with Records of	Percentages of Total Motormen Weeks Ended June 7, 1919	Percentages of Total Motormen Weeks Ended May 28, 1920
10 to 15 per cent	4.2 per cent	......
15 to 20	18.1	......
20 to 25	28.7	......
25 to 30	22.8	4.8 per cent
30 to 35	11.4	34.2
35 to 40	7.8	38.7
40 and over	7.0	22.3

It will be noted that the first week our system was fully equipped, which represented a better condition than before the coasting clocks were installed, 73.8 per cent of our motormen coasted less than 30 per cent, compared with 4.8 per cent during the week ended May 28, 1920.

Effect of Increased Coasting on Kilowatt-Hours per Car-Mile

Beginning with the first month the recorders were in operation, a marked reduction in kilowatt-hours per car-mile became apparent. This is best shown by Table III., giving kilowatt-hours generated per car-mile operated for two years prior to the installation of recorders and one year with the coasting recorders in use. The figures in the second lines represent the mean temperature for each month, obtained from the Weather Bureau.

A detailed study made over two comparative periods, one preceding and the other subsequent to the installation of coasting recorders, showed that a greater proportionate reduction in kilowatt-hours occurred at the time of peak load than occurred during the non-rush period.

Savings Effected

The results of the reduction in power demand for car operation, both in kilowatt-hours and equivalent coal value, are shown in Table IV.

TABLE III.
KILOWATT-HOURS PER CAR-MILE

	Without Recorders		With Recorders	Percentage Reduction 1919-20 vs.	1919-20 Coasting
	1917-18	1918-19	1919-20	1918-19	Per Cent
June	3.45	3.59	3.25	9.3	28.1
	73	71	74		
July	3.33	3.49	3.15	10.2	30.0
	77	74	77		
August	3.27	3.42	3.11	8.2	30.6
	76	78	74		
Sept.	3.50	3.49	3.23	7.6	30.6
	64	64	69		
Oct.	3.63	3.57	3.26	8.7	30.5
	52	61	63		
Nov.	3.97	3.67	3.265	10.9	31.8
	43	46	47		
Dec.	4.29	4.02	3.59	10.7	32.1
	28	42	33		
Jan.	4.60	4.12	3.799	7.9	32.1
	24	38	29		
Feb.	4.22	4.22	3.82	9.6	31.8
	37	37	33		
March	3.84	3.84	3.37	12.3	35.0
	53	48	46		
April	3.77	3.72	3.20	14.0	35.7
	53	54	53		
May	3.55	3.50	3.09	11.8	36.5
	70	65	60		

Our coasting campaign has had the effect of increasing the life of brake shoes from an average of 459 miles over a five-year period previous to the installation of recorders to an average of 699 miles during the past twelve months, or 52 per cent. The gross saving in brake shoes during the year of operation with the coasting recorders was approximately $3,000, making a total gross saving in coal and brake shoes of $36,717. The total cost of operating the recorders for the year was $7,913.

Accompanying the saving in brake shoes was unquestionably a reduction in wheel wear, which should be reflected in a greater life of car wheels. As the average life of car wheels is from two to five years, we are not able at this time to approximate the amount of this saving. Other equipment economies were undoubtedly effected, due to less wear and tear resulting from increased coasting, but these are not of measurable nature.

TABLE IV.

	1919-20 Versus 1918-19		Saving, 1919-20	
	Increase in Car-Mileage Operated	Increase in Kw.-Hr. Generated	Kw.-Hr.	Fuel Value
June, 1919	11.6%	1.2%	261,987	$2,219
July	12.9	1.6	295,665	2,540
August	14.7	5.3	233,628	2,000
September	17.0	8.1	214,361	1,828
October	23.3	12.6	262,043	2,233
November	13.2	0.8	319,540	2,636
December	14.6	2.3	360,774	3,070
January, 1920	11.9	2.6	269,158	2,261
February	12.8	2.0	306,072	2,562
March	14.8	0.6	412,785	3,802
April	9.6	5.7*	463,689	4,516
May	4.1	8.2*	403,815	4,050
Totals			3,803,517	$33,717

* Denotes decrease.

The average cost per motorman of operating the recorders was $23.62 per year, divided as follows:

Coasting instructor	$6.25
Recorder maintainer	5.42
Office employees	9.10
Paper tape for recorders	1.63
Envelopes and office supplics ...	.85
Recorder repair parts	.37
Total expense	$23.62 per annum
Fuel and rake shoe savings	109.60 per annum
Net saving per motorman	$85.98 per annum

We have 317 cars equipped with coasting recorders and the average number of motormen's records handled per day is at present 350. The operating force consists of one coasting instructor, one recorder maintainer, two clerks employed full time on detail record work and one clerk in charge of the record work, who devotes about one-half time to duties unrelated to coasting recorders.

Effect on Collisions

A close and continued study has been made to ascertain what effect a coasting campaign has on collisions, which has shown conclusively that such a campaign is not detrimental. Of the motormen involved in collisions during the first five months of 1920, 63 per cent had coasting records below their division average. The total number of collisions of cars with persons, cars and vehicles during the first five months of 1920 showed a decrease of about 20 per cent over the corresponding periods of 1918 and 1919.

Other Benefits

Coasting records have been of considerable value in furnishing an additional vehicle for conveying to the management the relative efficiency and value of motormen. The economic value of coasting having been established, new light is thrown on the individual operating efficiency of motormen formerly classed as "'good" motormen. We believe the effect of our coasting campaign has been beneficial in improving the general morale of our trainmen. We have been able to maintain a better inspection of our car equipment through following up claims of motormen that they were handicapped in their efforts to coast by cars not working properly. The recorders clearly demonstrated the economy of replacing trucks on thirty of our cars, and this work is now being carried out.

General

The ultimate success or failure of any form of power-saving device installed on the cars depends on the amount of interest displayed, particularly by the transportation department. We have established a fair coasting average as one of the requirements of the work of the motormen. This standard must of necessity be flexible to fit the various individuals. The time of the coasting instructor is entirely devoted to instructing motormen who have not reached or who have fallen below this standard, and this instruction is almost invariably followed by an improvement. Our experience has been that a coasting campaign does not go very far of its own momentum, but requires constant attention from responsible officials, and the results are well worth the effort required.

One-Man "Safety" Cars—Reasons Why Adoption Should be Considered

With the enormous increase in tramway operating expenses the financial future of nearly all tramways has reached a very critical stage. The old days, when a revenue of 10d. to 11d. per car-mile justified an increase in the car mileage, with working expenses of 6d to 7d. per car-mile, have gone, and probably will never return. The new position can be met in three ways—(1) By raising the fares; (2) by putting the loss on to the ratepayers or shareholders, as the case may be; and (3) by further economies in the cost of operating.

Tramway fares are not an absolutely necessary commodity, and many undertakings are finding out that an increase in fares does not result in the anticipated increased revenue. The passing on of increased costs by putting up prices in adopting a line of least resistance, and is bad for the community as a whole. Such a procedure should be the last resource, after exhausting everything that will lead to greater economy and efficiency. Public utilities have done much to prove what can be done in these directions.

The introduction of one-man cars would seem to be an important solution of (3) in the case of many undertakings, and it is somewhat surprising that no undertaking here has, I believe, adopted this principle.

Progress of One-Man Car Operation

We have many important examples of the successful operation of one-man cars in America. There are, I believe, over 1,000 cars of the Birney safety type operating in about 100 different undertakings. My company, who operate the electric light, power, and tramway undertakings of Ballarat and Bendigo, Victoria, introduced one-man cars in May, 1913, on 8½ routes out of 11. Two other tramways in Australia and several in New Zealand have one-man car operation seriously under consideration. I am aware that the reasons for the great advance in one-man car operation in the United States cannot altogether apply here. In America the light one-man car, with its lower operating costs, making it possible to give a more frequent service, has replaced heavy cars up to 25 tons; also the flat-rate fare in force in the majority of undertakings has assisted in their introduction. The one-man car has therefore in many cases been able to effect a saving of nearly 50 per cent. in our platform costs, which is sufficient to have a very important effect on the financial position.

Ballarat and Bendigo One-Man Car Operation

Owing to certain wage awards in 1913 it was imperative to consider every possible economy. We are running today with a reduction of about 35 conductors. The present cost of an adult conductor, based on the same rate as a motorman, including his holidays and uniform, less the additional amount paid to the one-man car drivers, amounts to about £190 per annum. Nearly all tramways in Australia are running with adult conductors excepting our own undertaking and another, and generally this is the practice here. If the comparison is therefore made with adult conductors to agree with the conditions here, the above represents a saving of some £6,650 per annum on a total tramway revenue in our case of £50,000 per annum. It should be remembered that, in addition to saving the conductor's actual wages when on the car, there is his signing-on time, meal-time allowance, his annual holiday, and cost of uniform, together with saving in tickets, ticket-punches, way-bills, signing-off time, and the office cost of checking the way-bills.

Our system of one-man car operation was fully described in the "Electric Railway and Tramway Journal" for September 3, 1915, but a brief description may here be of interest. The average speed of the two undertakings is nearly

[illegible]

eight miles per hour, and it has only been found necessary to slightly lower the previous schedule speed on two of the routes. The cars are all single-deck, and are converted for one-man operation by attaching hinged gates to each end of the car on both sides. The rear ones are kept closed, the entrance and exit being effected by the front gates adjoining the motorman. The fare-box is hung behind the driver and adjoining the entrance into the car. Arriving at the terminus, the motorman carries it to the other end of the car. There are hinged notice-plates just above the dash, one side notifying "Pay as you enter" and the other side "Pay as you leave." This system, I believe, was originated by us, and has the following advantages—Cars travelling from the suburbs to the centre of the town notify "Pay as you enter" at each end of the car, because passengers are picked up in small numbers along the route and leave the car often in bulk when they reach the centre of the town. Cars travelling to the suburbs notify "Pay as you leave," thus enabling the heavier loading in the centre of the town to be effected without any delay in the collection of fares. The "Pay as you enter" notification is a hint to passengers to get their fare ready before boarding, and the "Pay as you leave" notification gives them time when in the car to get their correct fare ready.

Fares, Fare-Boxes, and Systems of Check

The fares on the one-man cars at Ballarat consist of 2d. and 3d. cash, with a very small proportion of 1d. fares, and celluloid tokens of the value of 7 for 1s. and 5 for 1s., which can be presented as an alternative to a 2d. or 3d. cash fare. At Bendigo there are only 1d. and 2d. cash fares in use on the one-man cars. On one route at Ballarat there are, in addition to the above, a 3½d. and 4d. cash fare, and at Bendigo a 6d., 5d. and 4d. cash fare. When there are many different fares on a route the one-man operation admittedly becomes difficult of application, and we have only introduced this system on the suburban end of the former route. When arriving at this section the conductor from town boards the upgoing car. Cars proceeding from town have all the fares over the one-man car section issued by the conductor, and the motorman has only to see that local fares on the one-man car section are placed in the fare-box. Passengers boarding the cars at the suburban end, if travelling beyond the local one-man car section, are presented by the motorman with a slip marked 3½d. or 4d., as the case may be and when the conductor boards the car he collects fares and issues tickets accordingly.

The fare-boxes, specially designed by us, are of simple construction, the coin or token falling on to a plate positioned inside the box with two sides glass, which plate can be tilted by the motorman, the fares then falling into the lower receptacle.

A looking-glass reflector is arranged inside the glass box, which assists in making the payment of a fare as public an operation as possible. I believe that this method constitutes a strong moral check, and that missed or incorrect fares rarely ever occur; in fact this system ensures probably less irregularities than with the ticket-punch system. The inspectors do certain duties in private clothes on these cars. The motorman does not handle any fares, which will be recognized as an advantage, but only gives change when necessary or sells the tokens. The motorman, of course, has to be relied upon to watch over-riding, in the same way as is done by a conductor, and we believe that there are few of this class of irregularity.

Reduction In Accidents

One-man car operation, with passengers entering and leaving at the motorman's end, obviously leads to a reduction of accidents. There is frequently a weakness in the link between the conductor and motorman, and boarding or alighting accidents ensue. In our case a reduction of these platform accidents has been most marked; in fact, reduced to about one-eighth. What is very convincing is that the company, insuring us against third-party claims, have reduced our premium four times, or a total of 40 per cent., since the introduction of one-man cars.

The Application to Existing Rolling Stock

To those undertakings ordering new rolling stock the Birney safety type of car, with its labor-saving provisions, would no doubt appeal. Many undertakings, however, cannot in these days face new rolling stock. In our cars there are entrances at both ends of the car on each side of the same, and some systems here have their cars so designed. Where the entrance at the motorman's end is only on the right-hand side, then it would be necessary to alter this to the left-hand side, changing over the stairways when required. Many cars are already fitted with folding gates, so no additional expense would here be incurred. The Tramway Union, as might be assumed, did not take kindly to our innovation at the start, over-estimating the slight additional duties required by the motorman. We have had no trouble with the union since the start, and they honestly realize that the cars can be run with one man and give satisfactory service to the public, and that our finances cannot stand the cost of two-men operation. The motormen on one-man cars get 5s. a week extra, and the additional duties are so small that all the motormen press to take these duties in rotation. There must be many small undertakings working under serious financial strain who could, at no great cost, alter their cars and put them into one-man operation. Many of our larger tramway undertakings may have non-paying routes or routes with light traffic at the suburban ends which could be similarly changed over.

Development of Quebec Water-powers

In the programme outlined by the Hon. L. A. Taschereau, the new premier of Quebec, prominence is given to the further development of the provincial water-powers. Mr. Taschereau pointed out that this development would enable the province to meet for manufacturing purposes any coal shortage. The province was capable of immensely increasing the production of electric power, and it would be the policy of the government to develop to the utmost the water powers. "If we undertake the storage of the waters of our rivers, build new dams, and multiply our water powers, and if we thus place ourselves in a position to electrify our railroads, to supply motor power to our workshops, and light and heat to our people, we shall, I believe, have realized the dream cherished by many in our midst at the dawn of the twentieth century."

A Cornwall Reorganization

A committee of five representing the Cornwall Town Council and Board of Trade will investigate the proposal of Brig.-General C. L. Hervey, of Lancaster and Montreal, to acquire the Cornwall Electric Street Railway, Light & Power Company Limited, and the Stormont Electric Light & Power Company Limited, now owned by the Sun Life Company of Montreal. The proposal is to form a new company, to be operated under the control of a Public Utilities Commission to be appointed by the corporation of the town of Cornwall. The town is to be asked to guarantee, both as to principal and interest, $300,000, of thirty year first mortgage six per cent. gold bonds. The net profits are to be divided between the company and town. It is proposed to engage an expert valuator to assist the committee.

The Contractor-Dealer

The Electrical Dealer Wants "Turnovers," Not "Left-overs"—The Members of Our Industry are Novices at Merchandising — Some Splendid Hints for the Man Who Lacks Experience

Stretching the capital is one of the tests of a successful dealer. Almost anyone with any merchandising ability at all can do things with plenty of capital, but it takes a genuine manager to do business on a scanty amount of cash.

The banana man loads his cart in the morning with, say, $10.00 worth of fruit. He returns at night with an empty cart and $15.00. Since he works every day, excepting holidays and Sundays, he turns his capital about 300 times a year. On a gross annual business of $4,500 he makes 300 separate profits, of 33 1/3 per cent., and all on an original investment of $10 plus the cart and his time.

Nor does this banana man carry an surplus stock. If some of his fruit gets over-ripe or is frostbitten, he sells it out at cost or less, just to get it off his hands. In this way he makes use of his capital all the time.

What would this man make if he had a capital of $10,000 instead of $10.00 and turned in on the same plan, 300 times a year?

Don't buy Too Much Stock

Not many dealers can successfully imitate the banana man, but a great many of them could go much further in that direction than they usually do. All dealers who are not blessed with abundant capital should be interested in trying to see how far they can make this capital go.

It is a rare business man who hasn't a lot of his money tied up in stock that doesn't move fast. Overbuying has been called the greatest curse of retailing. It seems to be inevitable that dealers will buy more goods than they need and some that they can't use at all.

Sometimes this is the fault of the dealer himself, but not always. He who keeps detailed records of past purchases and sales can judge his future needs pretty well. His calculations are only upset by backward business conditions, unexpected demands, or changing styles. In buying new goods, such novelties, he may have no definite guide and thus is dependent on intuition, but a dealer soon learns to approximate closely what his customers will buy.

Knowing with some exactness what will be his needs for a given period—a month—or six months—a dealer can gauge his purchases accordingly so as to obtain the most rapid turnovers. If some goods sell fast and he can stock them daily or weekly, that means he can handle the business in this line of goods with small capital. It is the goods that represent a high investment and turn only once or twice a year that tie up his capital. The less of the last class of goods he can get along with, the better for his capital.

There may be some who wouldn't know what to do with more capital if they had it, so they are not interested in releasing what was tied up in slow-moving stock. This money [illegible] can be used in taking advantage of cash discounts, in improving the store equipment, in advertising, in adding new lines, and in other ways.

So, Mr. Dealer, if you are losing cash discount or, if you lack ready cash, suppose you look through your stock to see where you can do with less, or where some items need to be pushed.

Down in Mississipi is a certain dealer who turns his stock once a month—twelve times a year. He does this with a stock of $4,000. The main reason why he is able to make his merchandise turn so fast is because he is always in the most intimate touch with his stock; he takes inventory once a month. He finds the live lines and pushes them; intelligent buying helps him to avoid the slowmovers to a large extent.

Getting Three Turnovers a Year

A Cedar Rapids, Iowa, man obtains three turns a year—which is above the average—and it is systematic methods that enable him to do it. He keeps single entry books in which he enters every day the sales by clerks and departments, cost of sales, value of stock on hand and in wareroom, money on hand, accounts outstanding, and other valuable information. He takes stock every two months.

It is clear that in these days of rising costs it is necessary for a dealer to get better acquainted with his stock. He must increase the number of turnovers through judicious buying, careful stock-keeping, and good salesmanship if he is to make a bigger profit.

"We want turnovers, not leftovers."

This sign is reported to hang in the office of a live western retailer.

It's a big business message in understandable business language.

A retailer's profit depends very largely upon how often he turns his stock and how much business he can do upon the least amount of capital.

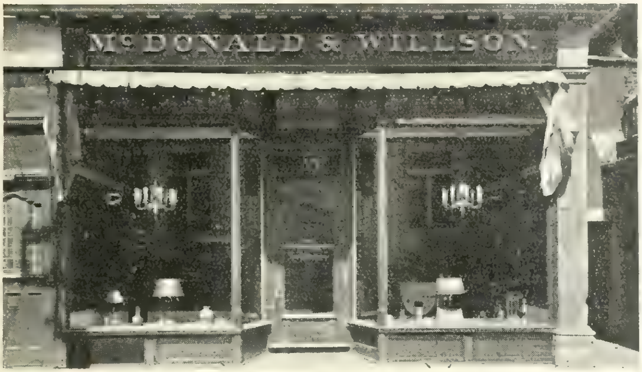
Business Records Are Necessary

Turning stock an extra time in any year is like finding money, because it does not take additional investment to make the extra profit. The money already invested simply works faster and produces accordingly.

But stock can't be turned by luck. Judicious buying, intelligent and forceful sales methods, and an exact knowledge of the facts concerning the business made possible by accurate business records, are all vitally necessary to accomplish the extra turnover in the face of new business problems resulting from the war.

The answer is to stock quick-moving lines in quantities just large enough to take care of the trade, and then to get behind them with plenty of sales effort. Small profits on a minimum investment is the big idea in present retailing methods.

If you have never figured stock turnovers, you can find how many you are making in your store by dividing a year's sales at cost by the average stock carried, also at cost. Another way is to divide total sales by the retail value of the average stock, but the mistake should not be made of dividing sales at retail by stock. It is best to figure turnover by lines, for this gives you a clue as to how fast or how slow each class of merchandise is moving.—Contact.



A window without a background so that lookers-in can see the goods that are on display

Montreal Electrical Dealer Recognizes That His Window Can be Made Magnetic to Draw in Trade

McDonald & Willson Co., Ltd., of Montreal, have a very fine store at 99 Drummond St. The store design is unique in that no line of demarkation shows where the window proper ends and the store space begins. In other words, the window display gives one the impression of looking into a room where electrical appliances are tastefully arranged without being crowded. Regarding their policy the company has this to say:

"Our windows are not boxed in. They are left wide open to the back for the public to see all the goods we have on display. We are not ashamed of any of our goods and believe in letting the public see them. In the front part of the window we exhibit, artistically arranged, table lamps, floor lamps, desk lamps, candlesticks, decorated vases, etc., and in the back ground electric washers, ironers, vacuum cleaners, irons, toasters and floor lamps. We have three spacious showrooms, where we exhibit our "Character and Quality" "Made in Canada" lighting fixtures. Every period and thousands of original designs may be seen here."

One of the handsome showrooms of McDonald & Willson, Montreal. Every "period" represented in their fixture display

Avoid the Necessity for Clearance Sales—Make More Turnovers—Some Acid Tests to Apply to Your Business

In every line of retail trade there are periodic clearance or bargain sales. Yet it is an open question whether such sales are a necessity. It is conceivable that where lines are carried which go out of so-called style in a very short period, it is necessary to get rid of surplus stock at a sacrifice, but surely this should not be the case with electrical goods, in connection with which the style feature plays only a very minor part.

There are many evils of the clearance sale, but there are two which stand out pre-eminently above the rest. The first is the influence it has upon the public. Once they get to realize that periodic sales will be put on by the retailer, they withhold their buying until this event occurs Not only then does the dealer lose the fair profit on a large percentage of his goods, but the public also goes away with the idea that under normal conditions the dealer is making an unnecessarily large profit. The other prime objection is that the reduction made in the sale of goods actually constitutes a part of the expense of selling and must, if the dealer is honest with his bookkeeping system, be added to his total operating expenses for the year. It is the failure to recognize this fact that results in so many retailers going out of business.

Some excellent suggestions are made in the latest issue of the S. E. D. Monthly Sales Service. This society, having made a study of the situation, realizes the difficulties in the way of the contractor-dealer and makes some excellent suggestions, a number of which we reproduce below.

Bona-fide clearance sales spell loss to the merchant holding them—goods that have not sold at profitable prices are offered at cut prices in order to get rid of them and release shrunken, inactive capital for other and better uses. The public has learned to expect the occurrence of those sales in many lines of business and, very generally too, puts off buying until such times.

Some merchants take advantage of that tendency of the public's, by buying stocks of goods to be sold upon a profitable basis during the sham clearance sales that they hold at frequent intervals. But the very many people who cannot be **"fooled all of the time"** discover the deception sooner or later—and then trade elsewhere.

Clearance sales, therefore, whether real or make-believe ones, are opposed to the intents and practices of successful merchandising, because they eventually react to hurt the business in one way or another. Genuine clearance sales, in addition to causing loss through selling at cut prices, advertise the merchant's lack of business ability—he bought too heavily; he did not analyze his market correctly; he was slow about pushing the sales of the goods or he went the wrong way about it, and so on. Sham clearance sales, which are intended to deceive the customers, react in many injurious ways upon the merchants who conduct them. So it goes.

The electrical dealer who conducts his business aggressively and with intelligent regard to merchandising principles and details has little need to resort to clearance sales. Certainly the causes for doing so are fewer and much less serious than in many other lines of trade. Because electrical appliances [illegible] are in another and broader sense staples of the first order. They are not seasonable to any serious degree as a class and they sell just as readily in January as July. So unless improvements have caught the dealer with a large stock of the old style goods on hand or he has accumulated a quantity of appliances which have been used for demonstrating purposes and which he cannot dispose of otherwise, he should have little excuse even for thinking about clearance sales.

These recommendations are intended to prevent the necessity for clearance sales arising. Give them careful study and a fair trial.

1—Make rapid turnovers the goal of your buying and selling efforts. Apply these tests to all that you buy:—

—is there a development need for this item in my trade?

—will my trade pay the price I must ask for this item?

—am I, myself, sold on the value and service quality of this item? Can I go about its sale with enthusiasm and conviction?

—have I the facilities and selling talent to display and demonstrate this item properly?

—can I safely give the required amount of time and effort to displaying and pushing the sale of this item, without slighting—and thereby retarding—the sale of other items now in stock or that have been ordered?

—how promptly can I have orders for this item filled and delivered to me—how small a quantity will be sufficient for me to carry in stock regularly?

2—Analyze your market before buying

Dealers who neglect to analyze their market and utilize the data so secured to guide their buying deserve to find themselves faced by the necessity for clearance sales. Unless their luck be phenomenal they are bound to get themselves into that fix, too.

The conditions which should regulate the buying activities of any community may be quite accurately determined, particularly so in regard to the smaller towns and cities and in the communities trading at neighborhood shops in the big cities. The dealer who does not know the number of wired houses in his field of prospective business, who cannot make a fairly accurate guess at the number and kind of appliances in use, who is uninformed regarding the purchasing power of his trade and their style of living, who does not carefully consider his business of the past in estimating what the future will be, who neglects to allow for competition—that dealer deserves to find himself loaded up with goods that cannot be moved except by cutting prices.

Whether the dealer recognizes the bearing that those just mentioned conditions exert upon his business or not, it is nevertheless, a fact that they are ever present factors in the success or failure of his operations. In fact, no dealer can well avoid giving some thought to those very conditions when making up his orders for stock. Some dealers, though, are content to guess at the status of those matters. To do so, however, is to go counter to the principles of sound business methods. No sensible man who cannot swim would jump off the dock into water of unknown depth. No foresighted dealer will risk loss by ordering stocks of goods without first learning the facts about the commercial sea which is the scene of his operations. Quite accurate data regarding those matters is not difficult to get; the Society will co-operate gladly. Much that is helpful has appeared in past issues of the Sales Service.

3—Analyze your purchases thoroughly

Having an understanding of what your trade needs and wants, be sure that what you buy fills those requirements.

The more nearly what you offer for sale dovetails with the needs of your trade, the easier it will be for you to make sales, prices and other things right.

If you take on newly developed appliances, things that mark another step in the advancement of electrical service, make allowance for the pioneer work that will have to be done to get the sales of the new device started. Merely because a thing represents an advancement and supplies improved facilities and service is no assurance that you will find the "line formed to the right" in front of your door, following the announcement in the papers that you have that thing for sale.

4—Know Your Goods and How to Present and Sell Them

That is "old stuff," but it's vital for that More sales are lost through the salesperson not properly understanding how to present and explain the goods than for any other one reason. Through the Sales Service many plans and recommendations for ferreting out the strong talking points of each item of merchandise that you carry in stock have been presented. Refer to those articles. Write the Society for special help if you need it. But whatever you do, be sure that all sales people in your store know how to present, explain and demonstrate the things they offer for sale

5—Put behind your goods all the selling push that you planned when you ordered the stock

Some dealers are apt to think "big" about what they are going to do to sell the goods they put in stock. Sometimes, too, they get help in building those "air castles" from the salesman who takes their order. Then other things interfere to prevent the dealer pushing those goods as vigorously as he imagined himself doing when he placed the order, and they take root on his shelves and in his stock room. Clearance sales and slaughtered profits are lurking in the offing with a stuffed club for the dealer who plays that trick upon himself.

6—Be a merchandiser, not a storekeeper

Only very seldom is it possible for the dealer who resorts to a clearance sale to get rid of inactive stocks to say truthfully that he exhausted every reasonable resource to sell that merchandise properly and at a profit, before slashing prices and inviting the public to take advantage of his shortcomings as a merchandiser. Be a merchandiser. The Society is ready and willing to help you keep business up and coming; the Sales Service is chuck full of practical helps to that same end So unless you can say in all truthfulness that you have tried all those avenues first before resorting to a clearance sale, then don't blame the goods, or say things about the public behind its back—just go before the nearest mirror and unload your wrath upon the individual you see there.

"Britelite" in the Electrical Building

J. H. Edmunds & Co., Toronto, have arranged for the uses of their Britelite lighting unit in the Electrical Building which is a new feature at this year's Canadian National Exhibition. The Britelite combines good illumination with excellent durability and simplicity of construction and is claimed to be a most suitable light for offices, stores, and large buildings. The installation in the Electrical Building will afford a splendid opportunity of judging the merits of this unit.

The Universal Electric Company, Truro, N. S., have recently purchased the business of W. H. Conn, Truro, N. S., as a going concern, carrying an up-to-date stock of electrical fixtures, washing machines, supplies, etc.

Effect of Selling Campaigns as Seen by a Central Station Manager

By F. B. Steele*

Central station companies have too often been so selfish as to desire for themselves not only the business of manufacturing and distributing electricity, but also the merchandising of appliances, and wiring as well. When the merchandising is done on a strictly so-called "merchandising basis," taking into account the various items of rent, telephones, light, heat, storage and breakage, and many other items as a true and just part of the cost of an appliance, and a fair profit is added, then you have nothing to fear, for the central station company is only a fair and just competitor, which you can easily meet on a competitive basis.

The point of view of the central station company is more or less warped by the importance of marketing its own particular product. Consequently the department designated to merchandise is more or less of secondary consideration, and the company or its management usually has a tendency to overlook the real business end of that particular department; although at times that part of the business may be behind as far as profits are concerned, at the same time the management usually says, "Well, we have the opportunity of making our profits on the sale of our electricity through the use of appliances."

But when all of these various items of cost are overlooked, and the central station in addition throws in a little bit of free service in the way of repairs and upkeep of the various appliances, what chance have you to sell? What happens? The contractor-dealers and their hundreds of employees as "boosters" for the company, and for the sale of appliances.

In referring to the subject which has been assigned to me, namely, "Effects from a Central Station Point of View of Co-operative Selling Campaigns," I may fail to measure up to what the subject might imply. However, my intent is to bring out some of the particular high points with which I have been impressed in the last two years here, with this very harmonious plan which we have adopted, and with which we have been very successful.

Sychronizing the Industry

In reference to the word itself—"co-operation"— which in definition means the act of working jointly together—I would change this and refer to the act as being more harmonizing" or "synchronism," "boosting" or concurrency of thought and action, which I think is more applicable to the case than actual "co-operation."

We abandoned appliance sales in December, 1918, with the understanding that we would join with the contractor-dealers in all their undertakings, sharing our part of publicity and advertising expense; at the same time give them exclusive use of one of our show windows without charge. We would expect in return compliance with the rules and regulations of the company and earnest effort on their part to promote the sales of the appliances to the fullest extent.

We installed in our lobby a bulletin board which shows in alphabetical order a list of electrical contract-dealers, which is referred to any customer seeking the name of a reliable contractor or dealer.

We supply the window lighting, floor covering, screens,

---

*Vice-President [illegible] Power [illegible] the New York State Association Convention.

[illegible] the company, the essential for good window displays. The company supplies the necessary appliances or merchandise and a professional decorator trims the window.

Dinner to Dealers

In December of each year, we tender to the contractor-dealers a dinner, at which time reports are presented as to the progress made during that particular year. Last December at our meeting we endeavored to show the opportunity which we have before us for making large sales in appliances, motors and the wiring of same.

Successful Drives

During the year 1919 three special sales were conducted in which members of the local contractor-dealers' association together with this company united, each participant paying his pro rata share of the advertising, demonstrating and incidental expenses.

The first activity occurred during the first two weeks in April, the object being the demonstration and sale of washing machines.

The second campaign occurred during the early part of May for the merchandising of vacuum cleaners.

The third effort had for its object the wiring of old houses. During the months of November and December the various members of the association offered a special plan through which a flat price was made per outlet, including fixtures if desired. Contracts were secured for wiring of approximately 200 old houses. The results of this effort continued for several months, in fact throughout the winter.

Shall Central Stations Merchandise?

There are some central stations to-day that are merchandising and at the end of the year are successful in showing on their reports good and plausible reasons for carrying on their merchandising business, inasmuch as they no doubt will show a reasonable and fair profit on the undertaking. In the West there are a number of companies which are selling a large number of appliances by keeping a very large staff of solicitors busy going from house to house in personal canvassing; and although this is apparently very successful and the companies seem to be very selfish of this particular end of their business. I know in my personal experience that a large number of these persons who purchase appliances were really sold in the beginning and consequently the central stations have had a large number of such appliances returned to them, which of course, require re-selling.

In support of the non-competitive policy, I understand that in Cleveland there are 20 stores devoted exclusively to the sale of electric goods. One department store alone, sells more than 8,000 flatirons per year. Another firm does a retail business of approximately $500,000 worth of electric appliances per year. A specialty sales company contracted for $250,000 worth of washing machines, and is selling vacuum cleaners at the rate of 10,000 annually.

Our company, for what seemed good and sufficient reasons, went out of the appliance business, and events seem to have justified our action. Conversely, other companies, for what seem equally good and sufficient reasons, are staying in. If the contractor-dealer of any city wishes to have the central station abandon its policy of selling appliances, it would seem that the initiative would be with the contractor-dealer to offer the company an inducement which is more attractive than the merchandise sales it makes.

If the company can be shown the equivalent, though the values may be intangible in actual dollars, but substantially through increased consumers' revenue, more harmonious relations, and the spreading of deserved good will in the interest of the utility by the contractor-dealers, I am sure that your utility will give your proposition favorable consideration.

What's Electrical Appliances Got to do With Home Troubles

Harry Thompson was fed-up, tired and hungry when he reached home, and it didn't mend matters to find everything there at odds and ends and his wife also tired and cross. His had been a strenuous day at the office, nothing had gone smoothly and the hot sultry weather had turned the office into a miniature furnace. And then to come home to this. The annoying part was that this was not the first time by any means. Lately his wife appeared to be losing her grip of things with the consequent result that home, children, wife and all seemed to be bearing the mark of untidiness.

He knew things had been harder for Mary since the servant left. It had been impossible to get another, but all the same he couldn't quite see that things needed to be in just such a state in the home.

The inevitable result of a fed-up husband and a cross wife each trying to air their grievances at the same time, was a quarrel which they had not got over when Thompson left to go to the home of his partner on a matter of business.

Joe Lindsay was the senior partner of Lindsay & Thompson, seed merchants. He sensed at once that something was wrong with his friend and suggested a cigar and walk in the garden before settling down to business.

"Say Harry, what's the trouble?"

Thompson tried to look surprised, but didn't succeed very well and at last burst out savagely.

"I don't know what's come over Mary lately. You know how things have been at the office this last month or so, and when I get home in the evenings I look forward to finding things restful and cheery, instead of which I always find things at sixes and sevens, Mary tired and cross and often a lot of work to do. Before we lost the servant we could go out in the evenings without any fuss, and enjoy the play, band or whatever happened to be the programme, but now it's simply frightful." and he chewed at his cigar quite viciously.

"I'm awfully sorry old man," said Lindsay, "but that's a problem you have to thrash out for yourself. I had similar trouble a year or two ago, but mine was a simple remedy. Just the introduction of a few labor saving appliances and everything smoothed out wonderfully."

"What's appliances got to do with home troubles?" asked Thompson impatiently.

"Everything! The fact was my wife was overworked and consequently always tired out. Gradually she lost interest in things, as you tell me your wife has done, and I tell you, Harry, I began to fear for our future happiness. Finally I got desperate and began quietly to take notice and ask questions. I soon found out that the trouble was overwork. We were in the same fix as you, couldn't get a servant for love nor money. One morning at breakfast I noticed in the paper a full page advertisement with large headlines reading 'If you can't solve your servant problem we will solve it for you.' You bet I just bolted to the address of the advertiser, Jones Bros., electrical dealers, and had a talk with the manager. To come to the point, he satisfied me that a washing machine, dishwasher, and vacuum cleaner were the very things I needed and for luck I threw in an iron, toaster, grill and percolator. I said nothing to Lillie about what I had done but arranged for the goods to be sent up immediately and also for a demonstrator to call and show the wife how the various appliances worked. You should have seen the difference, within a few days the old atmosphere of peace and contentment reappeared and Lillie lost her tired look and cross manner. It cost me about $600 to do it, but it was well worth the money."

This recital was ended in Lindsay's den and was followed by business.

Thompson arrived home in a very thoughtful mood and found his wife still ironing and looking quite exhausted. Going up to her he put his arms around her and said:

"Dear, I've been a fool, but have learned, tonight, how to stop being one, at anyrate in respect to our home life." Then he told her of his talk with Lindsay and suggested their going down to Jones Bros. the very next morning. Mary brightened up at this and consented to go.

The next day was a happy one for both of them. An outfit similar to the Lindsay's was purchased and Thompson went back to the office optimistic that at last his home troubles were lessening, while his wife went home to wait for the things which would make housework a pleasure.

Window Demonstration Attracts Large Crowd

There are demonstrations and demonstrations, the difference being the point of appeal. Recently a firm selling the Hoover vacuum cleaner gave a week's window display, in the form of demonstrations, of this particular machine. A demonstrator appeared in the window at intervals during each day and showed exactly what the machine was capable of doing. The paraphernalia used was a strip of carpet, a box of sand, a box of chalk and one of lint. In addition to these were a number of cards bearing statements referring to the various operations necessary to work the machine, and to its best points. These were used by the demonstrator with the object of keeping up an intelligent communication with the people in the street. Two types of machines were used and demonstrations given with each. One machine was used for showing the actual work of the machine on a carpet, the sand, chalk and lint being used for this purpose. The other machine was a smaller one and was so placed on a table that the various parts usually out of sight were displayed. The value of the revolving brush and the power of the suction was shown to the spectators by means of a piece of carpet folded to four thicknesses and placed over the nozzle of the machine. Over the top thickness of the carpet was sprinkled a quantity of white powder and the machine was then set running. The powder was drawn through the four thicknesses into the bag. It was noted that in ten minutes three different crowds of thirty men and women stopped and watched the demonstration. Immediately the demonstrator left the window the crowd melted away and only a few casual shoppers stopped to look at the machine in passing. A demonstration lasted about half an hour. Suppose this firm put on ten demonstrations each day for the five days and five on the Saturday this would mean, taking the above figures as an average, that 900 people stopped each day to actually watch the value of the machine, as a labor saver, demonstrated, and this does not take into consideration the people who merely took a casual glance and then passed on. In other words it means that there were approximately 1,000 new prospects for vacuum cleaners every day if there had been any means of acquiring their addresses.

For the first time in its history there will be an electric show at the Canadian National Exhibition, one entire building being devoted to the display.

Useful Illumination Information

In connection with illuminating problems, it is necessary to distinguish with care the difference between the intensity of light emitted by a given source and the intensity of resulting illumination at the place where work is done. The intensity of light emitted by the source is measured in candle power; whereas the intensity of illumination received at the work is measured in foot candles.

Candle Power—is the intensity of light given off by a standard candle.

A Foot Candle—is the intensity of illumination one foot away from a light source of one candle power.

In addition, there is another and more accurate method of calculating illumination—that is, in Lumens.

A Lumen—is the name given to a unit of light flux. It is the amount of light flux required to produce a uniform intensity of one foot candle over an area of one square foot. Thus a lamp may be rated in the terms of the total lumens it produces.

The candle power of incandescent lamps has heretofore meant the average horizontal candle power. The mean spherical candle power is the average in all directions. From this it follows that the mean upper hemispherical candle power is the average of the candle power values above the horizontal, and the mean lower hemispherical candle power is the average of all values below the horizontal plane. In rating incandescent lamps, past practice has expressed values in watts per candle (w.p.c., meaning watts per mean horizontal candle power), but in present practice lamps are rated in watts per mean spherical power (w.p.m.s.c.)

Computing in Foot Candles

In computing illumination in foot candles, the foot candle intensity desired is upon the plane of illumination, usually 30 in. to 42 in. above the floor. Desks and tables are generally 30 in. high, while lathes, milling machines, etc., may be 42 in. The greater distance light travels, the less is its intensity. This value can be computed by a known law, which is as follows:

$I = c.p./d^2$

I = intensity of illumination

c.p. = candle power

d = distance from unit.

For instance, one foot away from a light source of 16 c.p., 16 foot candles will be obtained, while 4 feet away, 1 foot candle will be the result. The above formula is true when the light rays strike the plane of illumination at right angles. Suppose they strike at some other angle, then the formula is changed to

$I = c.p. \times Cos^3 A / h^2$

I = intensity of illumination

c.p. = intensity of illumination

h = height above plane of illumination

A = angle between light ray and a perpendicular dropped from the lamp.

Computing in Lumens

The Lumen method of calculating for illuminating values is the easiest to apply as well as the most accurate. The total lumens emitted by a lamp may be found by multiplying the mean spherical candle power by 12.566 (4π). But all the light from a lamp is not effective, since some of it is absorbed by the reflector, and certain other amounts may be absorbed by the walls and ceiling.

As an example let us suppose a room 10 feet square is to be lighted with a 100 watt Mazda B lamp. The lamp

*Courtesy, Benjamin Elec. Co.

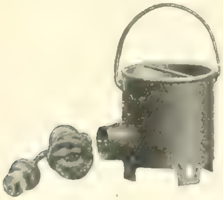
[illegible] ately 1000 lumens. If the reflector, ceiling [illegible] of the light, 45 per cent., or 450 lumens, will be effective. This amount of light spread over an area of 100 square feet gives a resultant illumination of 4.5 foot candles.

Table No. 1

A	cos³A	A	cos³A	A	cos³A	A	cos³A
0	1.000	23	.780	46	.335	69	.0460
1	1.000	24	.762	47	.317	70	.0400
2	.998	25	.744	48	.300	71	.0345
3	.996	26	.726	49	.282	72	.0295
4	.993	27	.707	50	.266	73	.0250
5	.989	28	.688	51	.249	74	.0209
6	.984	29	.669	52	.233	75	.0173
7	.978	30	.650	53	.218	76	.0142
8	.971	31	.630	54	.203	77	.0114
9	.964	32	.610	55	.189	78	.0090
10	.955	33	.590	56	.175	79	.0070
11	.946	34	.570	57	.162	80	.0052
12	.936	35	.550	58	.149	81	.0038
13	.925	36	.530	59	.137	82	.0027
14	.913	37	.509	60	.1250	83	.0018
15	.901	38	.489	61	.1140	84	.0011
16	.888	39	.469	62	.1030	85	.0007
17	.875	40	.450	63	.0936	86	.0003
18	.860	41	.430	64	.0842	87	.0001
19	.845	42	.410	65	.0755	88	.0000
20	.830	43	.391	66	.0673	89	.0000
21	.814	44	.372	67	.0597	90	.0000
22	.797	45	.354	68	.0526		

Two-Quart Electric Dry-Type Glue Pot

The Westinghouse Electric & Manufacturing Company has placed upon the market, an addition to its line of electrically heated dry glue pot, in a two-quart size. This glue pot is solidly constructed consisting of a glue vessel of copper contained inside of a steel case. The glue pot may be easily removed for cleaning. This vessel fits snugly, making a perfect thermal contact with the heating element. There are certain points of advantage and improvement claimed for this line of dry-type glue pot over all other forms of heating glue. The water bath is eliminated; with the old wet-type there was always danger of the water evaporating and burning the glue and the heater burning out; with the dry-type glue pot the current can be applied continuously without any danger of the heater burning out or the glue becoming overheated. The single-heat constant input heater gives the correct working temperature to the glue for continuous operation of the dry-type glue pot.



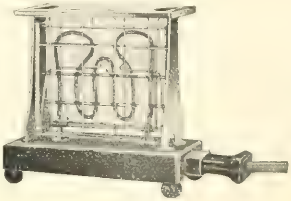
Dry type glue pot

Convention Oct. 4-9

The National Association of Electrical Contractors and Dealers of the United States will hold their twentieth annual convention at Baltimore, Maryland, on October, 4-9.

Two New Toasters

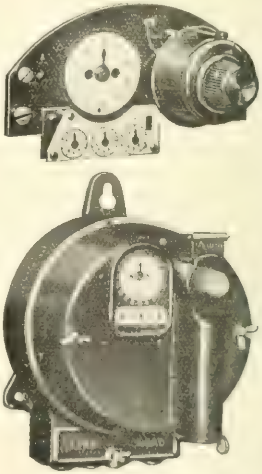
The Clemens Electrical Corporation, Ltd., of Hamilton, are placing two new toasters on the market. One is a wire constructed upright toaster mounted on an enamelled base. This toaster heats quickly, toasts evenly and is equipped with a toast holder. The other design is a sheet metal toaster mounted on enamelled base and of very attractive appearance. The helical form of heater is claimed to increase its efficiency. A feature of this design is that the heatiing element is replaced by simply removing two screws The contrast of black enamelled base and highly polished nickel body of this design is very pleasing.



Note helical form of unit

Prepayment Attachment for Watthour Meter

For supplying energy to small consumers and a shifting population, such as for example, as found at summer resorts, the type OA prepayment attachment for type OA watthour meter, just placed on the market by the Westinghouse Electric & Manufacturing Company, is said to be especially useful. By means of the attachment, a standard single-phase watthour meter can be converted into a prepayment meter, and if desired it can be changed back to a standard meter by replacing the standard register and cover.



The prepayment attachment mechanism is entirely mechanical. By placing a quarter in the top of the coin chamber and turning the knob in the direction of the arrow the meter is made ready to give electrical service as required by the consumer. This operation of the knob winds a clock spring which is unwound by gears at a speed depending upon the rate per kilowatt hour for which the attachment is furnished. When the spring is completely unwound, a quick-break switch is automatically opened and the customer is without energy until an additional quarter has been placed in the coin mechanism. The attachment can be supplied for rates of 4 to 25 cents per kilowatt hour.

Harvey Hubbell Standard Plug

In view of the discussion regarding the standardization of attachment plugs for all electrical devices, the Harvey Hubbell Company are making a special feature of the one shown herewith. This separable attachment plug meets the most exacting requirement and can be used in a separable manner or in connection with the lamp plug. It works perfectly with the T. T. slot receptacle which is used in a very large number of installations.

Merchandising Problems Discussed at Westinghouse Agent-Jobbers Association Meeting

Important electrical merchandising problems and policies were discussed at the eighth meeting of the Westinghouse Agent-Jobber's Association held at Hot Springs, Va., July 26 to 29. Approximately one-hundred Westinghouse agent-jobber's, members of associated companies, and Westinghouse officials and representatives attended the convention.

Exclusive Patents for Canada for Strowger Automatic Telephones

The Northern Electric Co. announce a contract agreement with the Automatic Electric Co. of Chicago, whereby they have acquired exclusive Canadian patents and rights to manufacture and sell Strowger type automatic telephone equipment in Canada and Newfoundland. This announcement will be of interest to our readers as arrangements now place the Northern Electric in the position of being able to supply all telephone companies with their complete requirements of manual equipment, automatic apparatus and machine switching apparatus. A form letter just sent out by the president of the company, Mr. P. F. Sise, states that they will be glad to have an opportunity of consulting with any engineering or plant organizations requiring automatic telephone service.

Trade Notes

The Harvey Hubbell Co. of Canada are distributing a folder describing the Hubbell flush receptacle with the adjustable aligning plate. It is claimed to be a wonderful time saver.

The Crouse-Hinds Co. of Canada are distributing a folder entitled "Making Lighting Safe", illustrated by a number of cuts which show the use of condulets on different units.

The Eureka Vacuum Cleaner Co. have moved their Toronto show rooms from 8 Temperance St. to new and larger quarters at 327 Yonge St., where they are now well equipped to demonstrate the value of their product.

The Main Electric Company of 165 Craig Street West, Montreal, have opened a warehouse and office at 28 St. Joseph Street, Quebec, under the management of Mr. W. F. McMannis. The company carry a large stock of electrical supplies.

Personals

Mr. Julian C. Smith, general manager of the Shawinigan Water & Power Co., has joined the directorate of the Dominion Bridge Company.

Mr. J. F. H. Wyse, representing the Ontario Safety League, and R. B. Morley, representing the Canadian National Safety League, recently attended a meeting of the managers of local Safety Councils throughout the United States.

Mr. Frank L. Butler, general superintendent of the Winnipeg Electric Railway Co., has been appointed to the position of manager. Mr. W. E. Blodgett has been made comptroller. He has been general superintendent of the companies properties since May, 1918, but Mr. Blodgett comes to Winnipeg from Utah.

Mr. T. R. E. McInnes, director of the Canton Electric Railway, was recently a guest of the regular Friday luncheon of the Electric Club of Vancouver, B. C. He favored the club with an interesting talk on the promotion of the Canton railway. He stated that he was boosting for the purchase of all supplies in connection with this corporation in Canada, pointing out to the Chinese the advantage they would receive through the rate of exchange. The railway, he said, has had a tremendous effect on real estate in that city and the trade possibilities are unlimited. He estimated that in twenty years the population of Canton would be from 6,000,000 to 8,000,000.

It is stated that radio telegraph direction finding stations are to be opened by the government at Chebucto Head, Canso and Cape Race. The purpose of this type of station is to ascertain the true bearings of a ship from the station, thus affording aid to mariners in determining their position. On and after the first of August these stations will keep watch and take bearings on wave lengths of 800 meters exclusively. Until further notice no charge is to be made to ships for the Direction Finding Service.

The Hydro-electric Power Commission of Ontario have issued an interesting booklet entitled "Hydro-electric Power in the Niagara District, Province of Ontario." It contains a brief historical sketch of the Hydro movement to date, concluding with the main features of the Chippawa-Queenston development.

Advertising in Russia

An American relates that while in Moscow before the war he saw a crowd gathered around a little fellow who was bawling at the top of his lungs. Many asked him what the trouble was, but he kept on crying, and the crowd increased; then all of a sudden he stopped and said in a clear, loud voice: "I am lost. Will somebody please take me home to Ivan Tobinsky the champion clothier of Moscow, who has a full supply of autumn overcoats, suits, neckties, shirts, hats and umbrellas, which he will sell cheaper than anyone elses in the city?"—Boston Transcript.

Speaking Figures

Figures compiled recently show that while Ontario has a total water-wheel and turbine horse-power installed of 1,015,726, Quebec has 910,029, while total horse-power actully employed in Ontario is 934,015 against 838,071 in Quebec. Ontario has an installed horse-power ratio to 1,000 of population of 360, while Quebec's ratio is 391.

A Seven Year Old Advertisement Secures a Customer

If you want proof that good advertising brings results, read the following:

The Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa., have advertised their motors in the Saturday Evening Post for many years now. Recently they secured an order from a gentleman who assured them that he had noticed their advertisement in a seven year old copy of that paper.

A B. Sc. Becomes Contractor-Dealer

Danforth Ave., Toronto, has another electrical store. At 161 Mr. A. R. Webster has opened up with a first class stock of fixtures, appliances and supplies. He will stock the Thor washing machine, Premium vacuum cleaner and Universal table appliances. Mr. Webster is a B.Sc. of Queens University, graduating in 1904. For nine years he was on the staff of the Northern Ontario Light & Power Co. The last two years he has been electrical inspector for the Ontario Bureau of Mines. The business will be known as the A. R. Webster Elec. Co. and in addition to the store prices will be given for wiring and fixture installations. Mr Webster has a very neat store with a well decorated window. He believes in starting in from the first as he with an ideal and that ideal: Good Service first, last and means to continue. The store might be considered as one always.

K. H. Bronson Joins Square D Company

Mr. Karl H. Bronson has joined the ranks of the Square D Company, Detroit, manufacturers of the Square D Safety Switch, in the capacity of Director of Research Engineering. Mr. Bronson is a graduate of the University of Michigan and has formerly been associated with the automobile industry. He was affiliated with Dodge Brothers, Detroit, in sales promotion and advertising work and later engaged in similar work for the Packard Motor Car Company, Detroit, from which company he resigned to join the Square D Company. Mr. Bronson will be actively engaged in the extensive safety campaigns which the Square D Company is undertaking.

"For Milady's Convenience"

The Harvey Hubbell Company of Canada, Limited, have prepared an attractive little booklet entitled "For Milady's Convenience," showing with illustrations, as well as in a conversational way, the numerous uses to which wall outlets can be put in the home, in adding to the convenience of the housewife, and in reducing her hours of labor. The double T. socket which they have adapted to these outlets, enables one to operate two appliances from the same point just as easily as one. This booklet should be of the greatest assistance in adding to the popularity of electric apparatus.

Western Red Cedar Association

The Western Red Cedar Association recently held its fifteenth annual meeting at Spokane, Wash. Among the items discussed was that of butt treatment of poles. It was stated that the National Electric Light Association had been investigating very carefully the different methods of treatment of poles, the results secured, etc., and are now promulgating new treating specificataions with a view of making them complete and standard.

It was decided to extend an invitation to all members of the N. W. division of the N. E. L. A. in attendance at their annual convention in Spokane, September 8th to 11th, to visit the Cedar Pole Butt Treating plant at Sandpoint, Idaho, and to make all necessary arrangements to take the delegates to Sandpoint and give them the opportunity of seeing the treating plant in operation and inspect the new puncturing machine.

Illuminating Engineering Society Annual

The Illuminating Engineering Society will hold its fourteenth annual convention in Cleveland, Ohio, from October 4th to 7th. Convention headquarters will be at Hotel Statler. Among the papers to be presented will be the following:

Modified views on the theory of light; Some applications of photoelectric cells; Knowns and unknowns of light production; Optical principles in illuminating engineering; Measurements of reflection factors; Effect of the variation of intensity of illumination on functions of importance to the working eye; Notes on department store lighting; Pleasing proportions of direct and diffused light; The problem of brightness; Central Station methods for securing high standards in stores and homes; Some out-of-the-ordinary applications in mill work; An improved method for illumination of motion picture theatres; Recent applications of color in lighting; The high cost of poor lighting; A new form of light meter; Central station experience in the improvement of factory lighting; Lighting of shoe factories.

Miscellaneous

St. John, N. B., are testing out one-man cars for their street railway system.

Sir Lomer Gouin has joined the board of the Shawinigan Water & Power Co.

According to a recently quoted statement of Sir Adam Beck, water power development in the province of Ontario now saves something over six millions tons of bituminous coal per year.

Crouse-Hinds Company of Canada are distributing Bulletin No. 303A (supplement to No. 303) illustrating and describing Imperial Flood Light Projectors, Types S. D. N. for river and harbor service.

The Town of Mennedosa has entered into agreement with the Minnedosa Power Co. for the purchase of the company's light plant and equipment for the sum of $52,000 and is asking the Manitoba Power Commission to take immediate action towards installing an auxiliary plant.

Current News and Notes

Aneroid, Sask. S.

The town council of Aneroid, Sask., S., will install a new lighting system. The contract has not yet been awarded.

Brandon, Man.

The Manitoba Department of Public Works will let the electrical work on the new nurses' home at the Brandon Asylum, Brandon, Man. Architects, Jordan & Overs, C.P.R. Bldg., Winnipeg, Man.

Brantford, Ont.

Brantford is greatly worried over the power shortage. Several new factories, about ready to produce, can go no further until power is available.

Collingwood, Ont.

The Imperial Steel & Wire Co., of Collingwood, Ont., are in the market for 6-75 h.p. 110 volt. belt and direct drive motors for the new wire and nail mill they are erecting at the above point.

East St. John, N. B.

The contract for the electric wiring of a new school at East St. John, N.B., has been let to the Webb Electric Co. 91 Germain St.

Edmonton, Alta. N.

Messrs. Elfner Elec. Co., Calgary, Alta., have been awarded the contract for the electrical work on the new medical building of the Alberta University, Edmonton, Alta.

Messrs. Hillas Elec. Co., Jasper Ave., Edmonton, Alta., have been awarded the contract for the electrical work on the additions to the warehouse of Revillion Freres, 104th St., Edmonton, Alta.

The Alberta Department of Telephones will install exchanges at the following places: Lougheed, Blackie, Three Hills, Viking, Olds, Youngstown, Didsbury, Bassano, Castor, Red Deer.

Essex, Ont.

The town council of Essex, Ont., contemplate making a change in their waterworks system. This will mean the installation of an auxiliary plant with hydro power.

Fordwich, Ont.

The town council of Fordwich, Ont., will submit a bylaw to the ratepayers, for permission to install a hydro-electric system.

Fort Erie, Ont.

The Fort Erie town council have decided to install a new electric lighting system.

Fort William, Ont.

The Fort William Board of Education are erecting a new technical school and will let the electrical work. Architect, R. E. Mason, Victoria Block, Fort William.

Glace Bay, N. S.

Messrs. MacKay Electric Co., Charlotte St., Sydney, N. S., have been awarded the contract for the electrical work on the new Orange Hall, Glace Bay.

Goderich, Ont.

The National Shipbuilding Co. are erecting a flax mill at Goderich, Ont., and want prices at once for electrical equipment.

Halifax, N. S.

Messrs. Arthur & Conn, Argyle St., Halifax, have been awarded the contract for the electrical work on the new Baptist Temple at the corner of North and Gottingen Sts., Halifax.

W. F. Spruin, Cornwallis St., Halifax, N. S., has been awarded the contract for the electrical work on five new residences to be erected on Tower Road, Halifax.

Contract for the electrical work in connection with the new pipe warehouse for the Crane Co. Ltd., St. Patrick St., has been let to Farquhar Bros., Barrington St.

Hamilton, Ont.

J. Dynes, Prospect St., has been awarded the contract for the electric wiring of a residence for J. A. Jones, on Leinster St.

During the recent storm which raged through the Niagara district the Dominion Power & Transmission Company's plant was put out of operation, and the street and all the suburban cars were stalled for hours. The house lighting system was out of business, as was also much of the telephone system, 200 phones in the west end of the city being burned out.

Kitchener, Ont.

The Dominion Tire Co., Kitchener, is building a substation on Dominion St. The Carswell Construction Co., Toronto, are the general contractors.

Lambton, Que.

It is reported that work is to be commenced shortly on the construction of an electric railway line from Disraeli to Lambton, Que., a distance of 18 miles.

Lennoxville, Que.

The Royal Bank of Canada, at Montreal, is receiving tenders for the electrical work on a new branch at Lennoxville, Que.

London, England.

The British House of Commons has authorized the expenditure of 10,000,000 pounds for the development of the telephone system.

Maisonneuve, Que.

Messrs. Vincent & Say Electrical Co., 351 Union Ave., Maisonneuve, Que., have been awarded the contract for the electrical work on the new branch of the Bank of Montreal, at the corner of 2nd Ave. and Notre Dame St., Maisonneuve.

Montreal, Que.

The Congoleum Co., Ltd., 1270 St. Patrick St., Montreal, Que., are erecting a new $110,000 factory on St. Patrick St. They are doing their own electrical work.

The Montreal Light, Heat & Power Co., 83 Craig St. W., Montreal, have been awarded the contract to supply 4,000 h.p. at the voltage of 10,000 and frequency of 60 cycles, 3 phase, for a period of not less than 25 years.

The Canadian Electrical Co., 250 Beaver Hall Hill, Montreal, have been awarded the contract for the electrical work on the alterations to the Windsor Hotel, Dominion Sq., Montreal.

Contract for the electric wiring of St. George's school, at the corner of Baldmere & Tellier Sts., will be let by the [illegible] Commission East District, 191 Stadacona St.

Montreal North, Que.

Contract for the electric wiring of the new church at the above point will be let by the owners, the trustees of St. Gertrude R. C. Church.

Montreal West, Que.

The electrical work on the new branch of the Royal Bank of Canada, corner of Westminster and Milner Aves., Montreal, will be let. Manager of premises, L. P. Snyder.

Moose Jaw, Sask.

Messrs. Carter-Halls-Aldinger Co., Ltd, Union Bank Bldg., Winnipeg, Man., general contractors for the new station and office building to be erected at Moose Jaw, Sask., will sub-let the electrical work.

New Toronto, Ont.

Messrs. Douglas Bros., 2137 Yonge St., Toronto, have secured the contract for the electrical work on the new branch for the Bank of Nova Scotia, which is being erected on the Lake Shore Rd.

New Westminster, B. C.

The Technical School Board, at New Westminster, has awarded the contract for electrical work on the new technical school to Messrs. Hume & Rumble.

Niagara, Ont.

The Niagara Falls Power Co. and the Canadian Niagara Power Co. have issued the following report for the quarter ended June 30: Operating revenue $1,497,878; operating expenses $271,834; amortization $144,000; operating taxes $186,935; total deductions from operating revenue $572,790; net operating revenue $925,087; non-operating revenue $58,043; net income, $983,131; interest on funded debt $358,806; miscellaneous $37,734; total deductions from net income $396,540, and surplus $586,591.

Ottawa, Ont.

The Dominion Loose Leaf Co, Ltd, 131 Wellington St., Ottawa, Ont., are making additions to their library bureau building, and will let the electrical work later.

S. Lewis, Metcalf St., Ottawa, Ont., has been awarded the contract for the electrical work on the additions to the Evelyn Ave. school, Ottawa. Also for the additions to the Breezehill Ave. school.

The Marchand Elec Co, Banque National Bldg., Ottaway have been awarded the contract for the electrical work on the new $50,000 restaurant on Rideau St., Ottawa.

Outremont, Que.

The electrical work on the new school at Outremont has been let to W. D. Birch, care MacVicar & Heriot, 628 Union Ave., Montreal.

Owen Sound, Ont.

A new ice cream plant, operated by electric power, has been installed in the business premises of Mr. S. T. Thomas, Owen Sound, Ont.

Sherbrooke, Que.

Messrs. Anglin-Norcross, Ltd., 49 Richmond St. W., Toronto, general contractors for the new $200,000 bank on the corner of Wellington and King Sts., Sherbrooke, Que., will sub-let the electrical work.

St. Catharines, Ont.

The Dominion Canners Co., Ltd., are erecting a new factory on Welland Ave., St. Catharines, Ont. General contractors, Newman Bros., 75 St. Paul St., St. Catharines, will let the electrical work.

Stratford, Ont.

The Bennington Electric Co., Ontario St., Stratford, Ont., has secured the contract for the electrical work on the new flax factory being erected there by the Stratford Flax Co.

J. E. Gillis has been awarded the electrical contract on several stores being erected at Sydney, N. S., by Fred Quirk, 584 Victoria Rd.

Stuart Lake, B. C.

P. Whittal, Victoria, B. C., has been awarded the contract for the electrical work on the new boarding school at the Indian Reserve, Stuart Lake, B. C.

St. Thomas, Ont.

The one-man pay-as-you-enter street car system has been introduced at St. Thomas, Ont., and although some little difficulty was experienced at the beginning in getting the patrons to accept the pay-as-you-enter idea, it is expected that the system will be working smoothly in a short time.

Three Rivers, Que.

J. B. Badeaux, 471 Maurice St., Three Rivers, has been awarded the contract for the electric wiring of an addition to a store at Notre Dame, Ste. Antoine and Craig Sts.

The city council at Three Rivers, Que., is contemplating the installation of 12 refrigerators at the public markets, each of these to be equipped with an electric motor.

Toronto, Ont.

Tenders will be called shortly for the electrical work on the addition to the Aura Lee club house, 205 Avenue Rd, Toronto.

The first shipment of ten cars of the one-man type have arrived at Toronto. These are the property of the city and will be put into operation on the civic lines.

Contract for the electrical work on an apartment house at Kendale and St. Clair Ave. has been let by the owner, John Walker, 528 Palmerston Ave., to E. H. Whiting, 453 Symington Ave.

Messrs. Richardosn & Cross, 17 King St. E., have been awarded the electrical contract for the factory of Kling Bros., at 241-3 Queen St. W.

Tenders are being received by Mr. D. H. Miller, 422 Oakwood Ave., for the electric wiring of a store and apartments on the west side of Oakwood Ave., near Jesmond Ave.

It has been announced that the Ontario Hydro Commission have decided against the construction of an auxiliary steam plant. Tenders received indicated that the cost of a plant to develop 50,000 h.p. would be over five and one-half million dollars and could not be ready for operation before December of next year. It was also estimated that the high cost of operation and price of fuel would add at least $10 per h.p. to the cost of power in the Niagara district.

The Canada Electric Co., 175 King St. E., Toronto, have been awarded the contract for the electrical work on the new theatre on Danforth Ave., Toronto.

Salisbury Electric Co, Ltd., 615 Yonge St., Toronto, have been awarded the contract for the electrical work on the new branch of the Dominion Bank, on the corner of Cherry and Commissioner Sts., Toronto.

Twenty-five one-man street cars have been purchased by Works Commissioner Harris, of Toronto, for use on the civic car lines. These cars will cost in the neighborhood of $8,000 apiece.

The National Electric Co., Ltd., 100 King St. W., Toronto, have been awarded the contract for the electrical work on a new $70,000 apartment house on Jarvis St., Toronto.

The Salisbury Electric Co., 615 Yonge St, Toronto, have been awarded the contract for the electrical work on the additions to the Bank of Montreal branch at the corner of Queen & Yonge Sts., Toronto.

CADMIUM-COPPER WIRE

— THE WIRE FOR WEAR —

During the War the whole of our output of Cadmium-Copper Wire was taken by the European Governments for War purposes.

We are now once more in a position to supply the requirements of our customers for this well-known wire in all sizes for Trolley Wire, Transmission Lines, Telegraph Wire, &c.

CONDUCTIVITY 7% TO 10% LESS } THAN HARD DRAWN COPPER
TENSILE STRENGTH **10% TO 75% GREATER** }
According to size of wire.

As an Asset Cadmium-Copper has the same Scrap Value as Electrolytic Copper.

TROLLEY WIRE

is manufactured by us in

ROUND,
GROOVED,
NON-FOULING,
SPECIAL SECTIONS

and has been supplied by us to the principal Street Railway Systems of the Dominion. The following Report was received by us from the Superintendent of one of the largest systems:—

> "On May 8th, 1919, we strung the outside curve with a sample of this wire. The opposite curve in the same direction had been strung with ordinary trolley wire a very short time previous.
>
> "On December 21st both curves were measured with a micrometer. This would give each curve 228 days' service, and taking 365 mils as the diameter of a 2/0 wire, we found that the maximum wear at any point on the cadmium wire was 20 mils, while the maximum wear at any one point on the ordinary copper wire was 60 mils. The average wear on the cadmium wire was 5 mils, and on the copper wire about 20 mils.
>
> "At the above rate of wear the cadmium curve should last **between two and three times longer** than the other curve."

SERVICE COUNTS

Eugene F. Phillips Electrical Works, Limited

ESTABLISHED 1889

Head Office and Factories - MONTREAL

ELECTRICAL EQUIPMENT EXCHANGE

Used Machinery Sold - - - - Special Equipment Offered

Wanted to buy established Electrical Business in any part of Canada. Box 354, Electrical News. 16-17

We are in the market for one Motor, 5 H.P., 220 volt, 3 phase. Also Quarter H. P. Motors, 110 volt single phase.

W. H. Sumbling Machinery Co.,
7 St. Mary St., Toronto.
17-18

Prices Wanted

City Engineer wants price at once on a 400 H.P. Synchronous Motor, 62 cycle, 900 R.P.M., 75 amp., 2,200 volts. For further particulars apply to the undersigned.

Z. LAMBERT,
City Engineer.

Three Rivers, P.Q.,
July 28th, 1920. 15-17

Idle Equipment

What is the depreciation on your idle equipment? The depreciation of machinery that is in operation is less than the cost of rust, dust, damage and the theft of small parts that disused equipment suffers.

One or two dollars spent in the "Electrical News" will get you a buyer. 12-t.f.

Digging Wealth From Buried Trees

Forests of New Zealand which flourished and died so many ages ago that the ground they covered is now swamp and plain, are yielding more than a million dollars a year to Maori natives and whites who dig kauri gum, the undecaying resin of the prehistoric trees.

Nearly $100,000,000 worth has been gathered in the last half century and an equal amount remains to be dug. From two to twelve feet under the surface of the earth the resin lies in strata which show that three successive forests matured and died in the creation o fthe deposit, which is used by manufacturers of linoleum and varnish in the United States and Great Britain.

The trees of the kauri forest today furnish the most valuable wood of New Zealand for general building purposes. The tree is a giant of the bush that ranks with the cedars and firs of northwestern America in girth but not in height. The diameter runs from four to twelve feet, with specimens that have mtasured 15 and even 20 feet. The height averages 80 to 100 feet, with a maximum of 150 feet.

The great gum deposits are not found in the forests of the present day, but on the fern-covered hills, plains and swamps. In some instances the buried forests flourished so many ages ago that no trace of them remains except the hundreds of millions of pounds of resinous exudations.

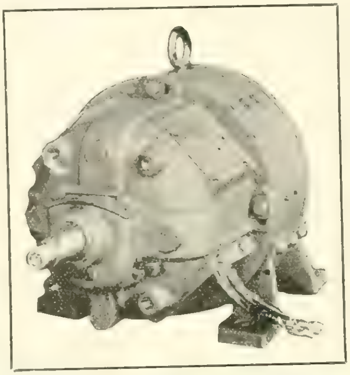
The gum fields are principally in the provincial district of Auckland in the northern part of the north island, covering about 1,800,000 acres. At one time kauri gum was so abundant that it was dug out with little trouble near the surface, but half a century's industrious digging has diminished the supply until now it is necessary to go down several feet for it. In some cases the excavations go to a depth of a dozen feet, and recently companies have been operating with convrted gold dredges.

The gum, as it is found, varies from the diameter of a marble to lumps weighing 100 pounds or more. In color it ranges from pale lemon yellow and reddish brown to almost black. Much of it is transparent or semitransparent. Its grades for market purposes are as varied as its colors. The most valuable deposits are found in dry soil and the best grades bring as much as $1,500 a ton.

Advertisements under "Situation Wanted" or "Situation Vacant" are charged at two cents a word per insertion, minimum charge 50 cents.

Advertisements for tenders, equipment, wanted or for sale, etc., or miscellaneous, are charged at $2.80 per inch.

All advertisements must be in the publisher's hands by the 10th or 23rd of the month to insure insertion in the subsequent issue.



TECHNICAL EMPLOYMENT

Positions Desired and Vacant

Thoroughly experienced electrician, having had considerable factory experience in motor assembling and testing, wishes position. Box 334 Electrical News. 15-16

Graduated electrical engineer, thoroughly perfected in great power stations and electrical traction (13 years practice in important European companies), seeks convenient situation in Canada. Apply Box 330, Electrical News 15-18

Electrician, 4 years I.C.S., wants position as assistant superintendent with large electrical firm. Seven years experience Hydro Rule and Regulations in installation. Capable at estimating. Would like to locate in Winnipeg or B. C. Reply Box 333, Electrical News 15-16

Superintendent of municipally owned hydro-electric power, light and railway system, desires change. Eastern position with power or industrial company preferred. Possesses technical and commercial training with wide practical experience in electrical construction, operation and maintenance with power, mining and smelting, and industrial companies.

Lowest salary considered Thirty-six Hundred Dollars.

Apply Box 277, Electrical News. 12-15

Works Electrician wanted, must be capable of rewinding all types of induction motors, and carrying out all necessary repairs to starting apparatus. Applicants must also have had experience in the running of three phase, five fifty volt alternators in parallel, and be capable of taking charge of both mill and power house equipment in the absence of the power engineer. State age, whether married or single, give details of previous experience, references and copies of testimonials Salary $175.00 per month.

Dryden Pulp & Paper Co., Ltd.,
Dryden, Ont.
16-17

Something Unusual

If you require a motor, dynamo, transformer or any electrical machinery of unusual capacity, dimensions, frequency or voltage, insert a small advertisement in these pages. You will reach the electrical trade of Canada and someone is sure to have what you require. 15-t.f.

Subscribe for the

ELECTRICAL NEWS

$2.00 per year

PETRIE'S LIST

of NEW and USED

MOTORS

No.	H.P.	Phase	Cycle	Volts	Speed	Make
1	60	3	25	550	750	Cr.-Wh.
2	52	3	25	550	720	Lancashire
1	50	3	60	550	970	Westg.
1	50	3	25	550	720	Westg.
1	35	3	25	550	720	Westg.
1	30	3	25	550	1500	Tor. & Ham
1	25	3	60	220	720	Cr.-Wh.
1	20	3	25	550	750	Chapman
1	20	3	25	550	720	Westg.
1	15	3	25	550	1450	Westg.
1	15	3	25	550	1400	Lancashire
1	15	3	25	550	750	Lincoln
1	15	3	25	550	720	Westg.
1	11	3	25	550	725	Union
1	10	3	25	200	710	Westg.
2	7½	3	25	550	725	Westg.
1	5	3	25	550	710	Wagner
1	3	3	25	550	1425	Lancashire
1	3	3	25	550	1400	Westg.
3	2	3	25	550	1425	Lancashire
2	1	3	25	550	1425	Lancashire
1	[illegible]	1	25	220	1460	Century
2	[illegible]	1	25	220	1425	Wagner
1	1/6	1	60	110	1150	H. & C.

Write Us for Prices

H. W. PETRIE, Limited

Front St. West - Toronto, Ont.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 296 Broadway
CHICAGO - - Room 803, 63 E. Adams St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, September 1, 1920 No. 17

Stand-by for Industrial Plants Problem for Efficiency Engineer

As the industries of Canada increase in number and importance the problem of power shortage and power interruptions becomes more urgent of solution. It is perhaph not too well realized that in the average manufacturing industry the monthly bill for power is a very small percentage of the items that go to make up the total cost of the manufactured article, and this being the case it is axiomatic that the cost of power is of much less interest to our industries than its dependability. Briefly stated we need plenty of power and we need it always available, but the cost is a secondary consideration.

This has been especially true during the past three or four years when our industrial plants have been choked with orders. Any delay, however small and trifling, meant an aggravation of an already difficult situation. Many a manufacturer has come to realize how great a financial loss may result from the shortest delay. It may be argued that the immediate future does not promise so urgent a demand for industrial products, but even if this is so it must be remembered that "overhead" is still the big item, and, like Tennyson's "Brook," it goes on forever, whether there is a power shortage or a power interruption or neither.

It was a realization of these facts, of course, that determined the Hydro-electric Power Commission of Ontario, earlier in the year, to install an auxiliary steam plant, a determination which, unfortunately, they have abandoned, as announced, because of the extreme cost of installation. The further question, therefore, arises whether there is any alternative recourse for the power user. Is the cost too prohibitive to install individual standby? Where a steam, oil or gasoline engine can be utilized it would appear that such an installaton may well be worth consideration. Take for example a gasoline engine. These can be furnished up to, say, three hundred horsepower at a cost of somewhere around sixteen dollars per h.p. This means an investment of forty-eight hundred dollars which at, say, twenty per cent. to cover interest, depreciation, etc., would mean an annual charge of less than a thousand dollars.

It is easily conceivable that many an industry using not more than three hundred horsepower could save more than a thouhand dollars per pear by eliminating power shortages and interruptions. Is this not a further field for the operation of the efficiency engineer?

Use of Electric Energy in Metallurgical Processes

A very complete resume of the extent to which electricity is used today in metallurgical processes, both on this continent and in Europe, appears in a recent issue of The Electric Journal. It will come as a surprise to many, that in Canada and the United States alone the amount of the load used in electro-metallurgical processes is approximately 1,300,000 kv.a. and this development may be said to have taken place in less than ten years. Electric energy is used either for heating purposes or for its electrolytic effect in the production of pig iron, steel, cast iron, the ferro-alloys, aluminum, copper, brass, lead, zinc, gold and silver. Steel production uses about half the energy total, with aluminum and the ferro-alloys next in order.

The electric smelting of iron ore is not now practiced on this continent. Of thirty-three electric pig-iron furnaces, Sweden has nineteen—partly because of very cheap power, and partly because of her neutral position during the war years. Power for smelting costs .2 cents per kw.h. in Sweden, as compared with perhaps .5 cents in Canada under the most favorable conditions. Location and the cost of coal will evidently have a very direct bearing on the future development of iron ore smelting on this continent. On the other hand, modern industry demands high grade products, and it has been clearly shown that the electrically-smelted ore is superior in purity and quality. This paper covers the various phases of the development of this industry, present and prospective, very fully, and we are reproducing copious extracts elsewhere.

The Public Utility Situation. The General Public Must be Told

The Society for Electrical Development have sent out a letter to electrical manufacturers, calling their attention to the necessity for their co-operation and moral support in advising the general public of the difficult conditions under which public utilities are operating at the present time. The letter points out that while many central stations are using their newspaper advertising space to appeal for moral support and, in some cases, for financial support, from the communities they serve, that this advertising is necessary local in its character. For this reason it is of more importance that manufacturers whose advertising is nation wide, should use their space in trade papers and magazines to point out the necessity for the public utilities securing the money required to carry on their work, and advocating the purchase of public utility securities to supply such power. The letter also points out that a casual manufacturer has already adopted this policy with splendid results. This point seems well taken, and will probably appeal to the average electrical manufacturer on the score that the success of the central station is necessary before the electrical manufacturer can hope for success. There are few people who can look at the financial situation to-day without realizing that electric railways and electric utilities generally have been hit harder by the increase in prices than almost any other industry, and yet, owing to the fact that many of them are tied up by long term franchises they find it impossible to increase their rates. This, at first sight, may appear to be a gain to the public, but in the long run is a loss. No public utility can give service if it is starved, and it is service in the long run the public need. Inefficient railway service, or telephone service, or light and power service means inefficiency in every home, office and factory throughout the area supplied. It is no economy to starve electric utilities.

Hydro-Electric Plant Building at Alice Arm, B. C.

The Taylor Engineering Co. Ltd., consulting and contracting engineers, Vancouver, are installing a hydro-electric plant for the Dolly Vardon Mine at Alice Arm, B. C. The water supply is obtaned by the diversion of Wolf Creek, which supply is augmented from the Trout Lake. The static head from the reservoir at Wolf Creek to the power house, which is located at Wolf Mine, near the Kitsault River, is 780 feet. A twelve inch wood stave pipe line, approximately 4,000 feet long, connects Trout Lake with the Wolf Creek reservoir, and a sixteen-inch steel pipe line, 2,000 feet long, connects the reservoir with the power house. Small intake crib dams are located at Trout Lake and Wolf Creek.

The power house is a log building, about 37' x 26', and contains a 500 h.p. Pelton wheel, 600 r.p.m., controlled by a Lombard governor. The Pelton wheel has a double nozzle, one of which is the needle nozzle type, the other being controlled by a deflector. The wheel is overhung on the end of an extended shaft, belt connected to a 450 kw. Allis Chalmers generator, 2,200 volt, three phase, sixty cycles; also belt connected to a 1,000 foot Ingersoll-Rand compressor. Compressed air is used locally at Wolf Mine, and electric power will be transmitted to the Dolly Vardon Mine, about three miles distant by a transmission line designed for 11,000 volts, but operated at present at 2,200 volts without transformers.

This initial unit forms the nucleus of a development which will ultimately reach 1,500 h.p. It is said that with additional water supply from the Clearwater Lakes there could eventually be made available some 30,000 h.p.

We Must Stop Importing Luxuries and Get Down to "Work"

The Canadian Reconstruction Association in their Information Service point out that "during August of last year the premium on New York funds when purchased with Canadian currency was around four per cent., and during the latter part of the month went somewhat below that amount. This year, despite increased agricultural production and the prospect of a considerably larger exportable surplus of grain from the current crop, both of which factors might reasonably be expected to help to improve exchange, the premium has been ranging from 12 to 13 per cent. It is time that the Canadian people realized that the exchange situation, apart from seasonal fluctuations, is becoming decidedly less favorable to this country. The explanation is found largely in an analysis of Canadian trade. The latest report issued by the Department of Customs shows that for the months of April, May and June, 1919, exports of Canadian products exceeded imports into this country for consumption by $43,481,284. For the corresponding period this year imports for consumption have exceeded exports of domestic products by $109,066,879. There may be some temporary improvement in exchange as a result of the sale of Canadian grain abroad, but no permanent betterment can be looked for until imports are drastically curtailed and exports increased to the largest possible amount. Otherwise, the discount on Canadian money is certain to attain a considerably higher level than at present, and the premium on New York funds may even make new records."

Ninety Per Cent. of Employees of Large Electric Firm Have Bank Accounts

Over 90 per cent. of the employees of the Westinghouse Electric and Manufacturing Company, at the East Pittsburgh Works, have taken advantage of the additional Insurance and Savings plan recently made effective by the organization. This, in effect, means that nearly all employees have savings accounts, because to be eligible for additional insurance the company requires each worker to deposit a portion of his earnings in the Employees' Savings Fund. Every employee when completing six months' service with the company, is given a $500 life insurance policy, free of charge and without any restrictions. By continuing with the company and depositing at least 2 per cent. of his earnings in the Employees' Savings Fund, additional insurance of from $500 to $1,500 may be secured, the amount depending upon length of service. A policy of from $1,000 to $2,000 may, therefore, be obtained by every employee of the Westinghouse Company depositing in the fund, which pays interest at the rate of 4½ per cent. compounded semi-annually on all deposits. To assist an employee to meet an emergency, loans are made from the Employees' Saving Fund. Every depositor can borrow 90 per cent. of the money he has in the fund, without in any way affecting the value of the insurance. Repayment can be made at the rate of ten per cent. monthly. The percentage of employees who have opened savings accounts with the company is much higher than has heretofore been obtained by other organizations with insurance plans. It is somewhat unique in industrial annals to now that 90 per cent. of the workers in one of the largest organizations in the world have savings accounts and through their thrift have made themselves eligible for life insurance policies of $1,000 and over.

Joint Conference of Engineering Societies

The Joint Conference Committee of the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers, acting as the ad interim committee in accordance with the authorization of the organizing conference held in Washington, June 3-4, 1920, is extending to Canadian engineering and allied organizations an invitation to become charter members of the Federated American Engineering Societies and to appoint delegates to the first meeting of the American Engineering Council, to be held in the fall of this year.

The Fort Garry Construction Co., Fort St., Winnipeg, Man., general contractors for the new work on the Anglican college on St. John's St., Winnipeg, wants prices on electrical supplies.

Greatly Increased Use of Electricity in the Production of Various Metals

Sweden Leads in Electric Production of Pig Iron from Ore on Account of Very Low Cost of Power—Higher Prices on this Continent Limit Operations to Metal Refining and Non-Ferrous Metals

The development of electrometallurgical processes to a position of great industrial importance during the last decade was one of the noteworthy steps in the progress of metallurgy. This development has been of utmost importance to the central station, as most electrometallurgical plants, especially electric furnace processes, use power from the central station. In 1910 there were electrometallurgical or electrochemical power loads in about 25 cities in the United States and Canada, but today such loads are found in over 200 cities. Ten years ago so little was known of the characteristics of the electric furnace load, that few power companies cared to have them on their lines. Today, with an electric steel furnace in practically every manufacturing city in the country, the load is considered a desirable one. The wide extension to so many communities is, of course, due mainly to installations of electric steel furnaces during the war. Although the number of steel furnaces installed was far greater than could have been foreseen ten years ago, and although many were installed mainly for war purposes, it does not appear that there has been an over-development in this respect. The quality of electric steel has become so established that the process is here to stay, and will probably supersede other processes for the production of castings, and super-refining will be widely used in the Bessemer and open hearth steel manufacture.

Disregarding electrochemical processes, electricity is used in the metallurgy of the following metals, either as a heating agent or for its electrolytic effect: pig iron, steel, cast iron, the ferro-alloys, aluminum, copper, brass, lead, zinc, gold and silver. Table I gives data regarding the quantity of power used in these processes in the United States and Canada as closely as can be estimated from information available. There is a total load of approximately 1,300,000 kv.a. used in electrometallurgical processes in the United States and Canada, not including motor load.

Table I—Installed Power Capacity in Electrometallurgical Processes in the United States and Canada

Process	Kv-a Load	Process	Kv-a Load
Pig iron	none	Brass	23,000
Steel	600,000	Lead	1,400
Ferro-alloys	200,000	Zinc	60,000
Aluminum	350,000		
Copper	45,000	Gold & Silver	1,000

Although the electric smelting of iron ore was developed simultaneously in the United States and Sweden, and although in 1908 Dorsey A. Lyon erected at Heroult, California, the first electric furnace to produce pig iron commercially, the process is no longer in operation in this country. Pig iron is being produced in the United States by electric melting of scrap, but not smelting iron ore. The plant at Heroult was increased to 5,000 kilowatts capacity, but in 1914 production of pig iron was discontinued and the plant operated on ferro-alloys.

On the other hand, development in Sweden and some other countries has been steady. The furnace developed is similar to the shaft furnace installed by Lyon in 1908, which is especially adapted for production of low carbon and silicon iron, and not foundry iron. It operates best with charcoal as a reducing agent, and in fact proved a failure at Hardanger, Norway, in 1912 when operating with coke. At Notodden, Norway, a furnace of the pit type has been developed, which operates satisfactorily with coke and also produces foundry iron. The last two furnaces operated at Heroult, California, were also of the low pit type, and could be operated with coke and charcoal mixed for production of foundry iron.

Electric furnaces for smelting of iron ore are now installed as shown in Table II. In 1910 there were two furnaces of a total power input of 3,500 kilowatts.

Table II—Electric Furnaces Smelting Iron Ore

Country	Type of Furnaces	Number of Furnaces	Size of Units Kv-a	Transformer Capacity Kv-a
Sweden	Shaft	19	2000 to 7000	64,000
Norway	Pit	3	1200	3600
Norway	Shaft	1	3000	3000
Switzerland	Shaft	2	3000	6000
Japan	Shaft	2	3000	6000
Italy	Shaft	6	3000	18,000

At the present time there are installed thirty-three electric pig iron furnaces of from 2,000 to 7,000 kv-a, a total load of 100,600 kv-a, having a production capacity of 250,000 tons of pig iron per year. During the war, production costs have favored electric smelting, so that electric pig iron is now being produced in Sweden for five dollars per ton less than blast furnace charcoal iron. This is in spite of an average increase in power cost of from eight to twelve dollars per horsepower-year.

The electric iron smelting furnace produces pig iron with a power consumption of from 2,000 to 3,000 kw.hrs. per ton of pig iron, the lower figure being for white iron and the higher for grey iron. The electrode consumption varies from 13 to 20 lb. per ton of pig iron. As the furnace operates with the arc buried in molten slag, this electrical load is very steady, with few fluctuations except while tapping. In a plant designed for efficient handling of electrodes, it should be possible to attain an average load factor of 80 per cent.

The Swedish furnaces use three-phase, 25 or 60 cycle power, with a secondary transformer range of 50 to 100 volts but usually operate at 80 volts. The furnace has six electrodes, with one of the three transformers to a pair of electrodes. The high-tension side is connected in delta. The load on the furnace is not regulated by raising or lowering the electrode, as on ferro-alloy furnaces, but by voltage control on the primary. On 25 cycles, the power-factor is 95 per cent., but on 60 cycle current it may be as low as 80 per cent.

Electric furnace production of pig iron will hardly develop to any great extent in the United States along the line of development in Sweden, because of the cost of power, but the writer believes that the time is coming, particularly in the western states, when pig iron, more specifically cast iron, will be made by melting of scrap iron, scrap steel, iron ore, coke and lime in the electric furnace to produce iron for direct castings or for pig iron. During the war, a considerable quantity of low phosphorus pig iron was made in Canada and the United States by electric melting of steel scrap. The production late in 1918 was 4,000 tons per month. Six plants were in operation in Canada and two in the United States. While it is not probable that these plants are operating today, there seems to be a future for the process, especially in foundries where the cost of pig iron is high due to freight. The writer knows of one city where the foundries pay $50 per ton for pig iron laid down at their plants. Iron in the ladle could be made by the electric process for $35 per ton.

The metallurgy of synthetic electric furnace cast iron was worked out on a large scale by C. A. Keller in France during the war. Three plants were erected with a total power input available of 40,000 kv.a. During the war 150,000 tons of castings were made with metal cast direct from these electric furnaces, of which there were 16 of from 1,000 to 2,200 kv-a size. The power consumption was from 675 to 800 kw-hrs. per ton of cast iron, with an electrode consumption of 15 to 20 lb. per ton of cast iron. Any grade of iron desired can be produced. All of the furnaces were of the single-phase type with two electrodes in series. The process was conducted as a continuous operation, the furnace being kept full of charge. With large units, the load is very steady, but it is probable that in the operation of small 500 kilowatt units there might be momentary overloads. These would be no worse than in a steel melting furnace. The power-factor of the Keller single-phase furnace is about 80 per cent. on 60 cycles. The furnace is operated at 50 to 70 volts.

Another use of the electric furnace is in refining gray iron from the cupola. Cupola iron, after treatment in the basic electric furnace, shows a marked decrease in sulphur and increase of transverse strength. At present the process appears adaptable only for the very highest grade of castings. The electric furnace is also being used in production of malleable iron castings, and has been considered as a mixer for keeping molten blast furnace pig iron hot before casting into pipe.

Steel.

The most marked increase in the use of electricity in metallurgical processes during the past decade has been in the electric furnace production of steel. In 1904 there were four small electric steel furnaces in operation in Europe. In 1910 there were sixty-seven furnaces in operation, eleven not working, and thirty-six in course of construction throughout the world. Of this total of 114 furnaces, seven were installed in the United States and Canada with a total power input of 5,600 kv-a and a charge capacity of 40 tons per heat.

On January 1, 1920, there were installed or under construction in the United States and Canada 363 furnaces with a total charge capacity per heat of about 1,600 tons and a power input of about 600 000 kv-a. Of the 363 furnaces, 323 were installed in the United States and 40 in Canada. The number of electric steel furnaces in the world is estimated at [illegible]

The production of electric furnace steel in the United States in 1917 was 304,543 gross tons. Probably 1918 and 1919 will show a production of over 400,000 gross tons for each year. Almost 50 per cent. of the 1917 production was alloy steel. Of the 323 furnaces in the United States, 54.5 per cent. are being used for making casting.s

The most marked development of the electric steel furnace has been in the production of ingot alloy steels for automobile construction and high speed steel. The electric furnace operating with a basic lining produces tons of high grade alloy steels per heat as compared with the crucible furnace producing pounds. Lower grade raw materials can be used, because of the refining to remove phosphorus and sulphur which can be readily performed in the electric furnace. The electric furnace has proven particularly successful in the production of alloy ingots, such as chrome-vanadium steel, turning out a product better in quality than similar open hearth steel with a much lower loss of alloys by oxidation. For the production of high-speed steel in large heats the electric furnace proved well adapted during the war, it being common practice to pour five ton heats of steel valued at three to five dollars per pound. However, the substitution of the electric furnace for the crucible furnace will be very gradual, because it is not yet demonstrated that average electric high-speed steel is quite equal in quality to the highest grades of crucible high-speed steel. To meet the grade of the highest quality crucible steels, the electric furnace product must be made from the most pure raw materials available, and even then, considering electric steel versus crucible steel from condition existing in each case, it does not seem possible that melting conditions can be as closely controlled in the electric furnace as in the crucible.

Ferro-Alloys.

The war demand brought the electric furnace ferro-alloy capacity to a point which, with the arrival of a more normal peace demand for ferro-alloys, puts the industry in much the same condition as existed in the European calcium carbide industry in 1899, when over-production and patent litigation compelled most plants to look for new products, which strangely proved to be ferro-alloys. The increase in installed furnace transformer capacity for ferro-alloys production was enormous from 1915 to 1918. In 1910 there were only two plants in the United States and Canada which produced ferro-alloys in the electric furnace. They had a total transformer capacity of possibly 20,000 kv-a. On January 1, 1920, there were forty plants with a combined transformer capacity of 200,000 kv-a. At the date of writing, probably 75 per cent. of these plants are not operating. Many of them are in the hands of a receiver and will eventually be dismantled. Probably not over half a dozen of the plants erected during the war, for war purposes, paid back their plant investment before the armistice. Companies which were organized with sufficient operating capital will doubtless, with proper management, return the investment in time. It will be slow, because the market has been dead for all alloys, except ferrovanadium, until two months ago, when the price of ferromanganese began to advance from as low as $100 per ton until now it has reached the war price of $250 per ton. This is due to failure of imports of ore. Between the buyers and the government war minerals policy, the domestic ore producers got such a shaking down after the armistice that it will be a long time before there will be any quantity of domestic ore produced, except by ferromanganese manufacturers operating their own mining properties.

With the enormous increase in plant capacity, the United States easily led the world in production of ferro-alloys when the armistice was signed. The plant capacity of ferrosilicon had increased from 10,000 or 15,000 tons per year to 100,000 tons per year. Instead of importing ferrotungsten and ferrochrome, large quantities were exported. Ferrovanadium, which had always been exported, was shipped abroad in larger quantities than ever. But the two most important developments have been the electric smelting of manganese ores and the increased use of molybdenum in steel.

In 1914 there were no electric smelting plants built mainly for production of ferromanganese. Two plants at Niagara Falls made it electrically at irregular intervals, presumably to keep their furnaces in operation when the market for other alloys was dull. On Armistice Day there were ten plants of total transformer capacity of 55,000 kv-a, and production capacity of about 80,000 tons per year. At the close of 1918 about 15 per cent. of the ferromanganese production of the United States was being made in electric furnaces. W two exceptions these plants are now out of operation, two largest having resumed work when the price of f manganese advanced several months ago.

Aluminum.

Since the separate discoveries by Hall and H 1886, that aluminum could be produced by electr alumina with a fluoride electrolyte, the yearly production of aluminum has increased to a world output of 489,000,000 pounds in 1918. Aluminum is now fourth in quantity production of non-ferrous metals, being surpassed only by copper, zinc and lead in the order named. It will probably pass lead and zinc within twenty years. In variety of uses it is only surpassed by iron and copper. All aluminum is produced in a direct-current, electrolytic cell with a molten electrolyte, usually heated by the passage of the current. The world output of 1918 required about 700,000 kv-a, and the estimated installed power capacity being used for aluminum in the United States at the present time is 350,000 kv-a. The production of the United States in 1918 was 225,000,000 pounds. France was the next largest producer with a production of 48,400,000 pounds. In 1910 the production of the United States was only 12,000,000 pounds and the installed power capacity about 75,000 kv-a.

The practical metallurgy of aluminum, as practiced in the United States, has been kept as secret as possible. In one of the most recently constructed plants the furnaces or cells take 20,000 amperes of direct current at seven volts. Seventy- of these furnaces are connected in series on a 500 volt, direct-current line. Power is supplied to the battery by a 10,000 kilowatt, direct-current generator direct driven by a water wheel. In most European plants, the direct connection of the water wheel to the direct-current generator has been common practice, because the aluminum plants were generally built at the power site. This practice has not been common in this country because the power source has usually been the high-tension line of a central station. The power consumption is about 15 kw-hrs. per pound of aluminum. The load is ideal for a central station.

In addition to the use of electricity in the production of aluminum, it is also used for melting aluminum in furnaces of the resistance type. A carbon resistor furnace of 500 kw capacity has been put on the market for this purpose.

Copper.

Since 1883, electricity has been used in this country to refine copper. There are nine electrolytic copper refineries in the United States. Direct current is supplied from motor-generator sets or converters. In electrolytic copper refining, pure copper is produced from blister copper, by suspending the blister copper as an anode in a solution of $CuSO_4$ acidulated with H_2SO_4, the current depositing pure copper on a copper cathode, the impurities forming an anode mud. The electrolytic copper refining capacity of the United States is 1,349,000 tons per year, requiring about 45,000 kv-a. Power is generally supplied at 145 to 220 volts, and the cells are usually connected in multiple. The greater part of the electrolytic copper refining capacity of the United States is located on New York harbor, and power is generated by steam in the power plant of the refinery. Seven to eleven pounds of copper are deposited per kw-hr.

The electrolytic deposition of copper from leaching plant solution is in practice on a large scale at Ajo, Arizona. The power installation is 15,000 kv-a, of which only one-half is required to operate the plant. As high as 2.5 pounds of copper have been deposited per kw-hr.

An increasing quantity of electricity is being consumed in the large copper smelting plants for removing dust from smelter smoke. A new Cottrell smoke treatment plant has been completed at Anaconda, which uses approximately 1,000 kw. This use of power will be increasing until almost every smelting plant is equipped. The process is also being used on manganese furnaces and lead furnaces.

There has been a remarkable growth of the use of the electric furnace for melting brass and non-ferrous metals. From one silver melting furnace of the carbon resistor type in 1914, the number had grown to 261 on March 1, 1920. Of these furnaces, 61 are carbon resistor furnaces, 118 are induction furnaces, and 82 are arc furnaces of various types. Furnaces are being used to melt brass castings, wrought brass, bronze, copper and nickel. The total estimated installed transformer capacity is 23,000 kv-a, of which one-third is for carbon resistor furnaces, one-half for arc furnaces, and the balance for induction furnaces. The carbon resistor furnaces operate at 98 per cent. power-factor, giving a very steady load. The most common size has 105 kv-a transformer capacity. The induction furnaces are built in the smallest units of any of these furnaces, taking 30 to 60 kw. load with a power-factor of 70 to 85 per cent. The indirect rotating arc furnace operates at 80 to 90 per cent. power-factor, and is built in sizes up to 300 kv-a. Depending on the kind of brass being melted, the power consumption varies from 250 to 400 kw-hrs. per ton.

The electric brass furnace is rapidly becoming an important load for the central station. Except for the single-phase feature it makes a good load for a power company. It is built in such small units that the fact it is single-phase should not prove seriously objectionable.

Lead.

Electricity is used for the refining of lead bullion by the Betts process at Trail, British Columbia, East Chicago, Indiana, Omaha, Nebraska, and New Castle on Tyne, England. The general layout of a plant is similar to that of an electrolytic copper refinery. Cast anodes of lead bullion and lead cathodes of electrolytic lead connected in multiple are suspended from copper bars across a rectangular tank in which there is an electrolyte containing lead fluosilicate and free hydrofluosilic acid. The current enters the anode, passes through the electrolyte to the cathode, dissolves lead from the anode and deposits it on the cathode. The impurities form anode mud or slime, which is refined to recover metals of value. The electrolytic lead refining capacity of the United States and Canada is about 90,000 tons of lead per year. The installed power capacity is about 1,400 kv-a. Fifteen pounds of lead are deposited per kw-hr. Power is generally supplied at 90 to 115 volts, and the cells connected in various arrangements.

Zinc.

The commercial application of electrolytic precipitation of zinc from sulphate solution in the hydrometallurgy of zinc is less than five years old. The first recorded production in the United States was 10, 963 tons in 1916, which in 1918 had increased to 38,885 tons. The electrolytic zinc production of 1918 was 7.3 per cent. of the total production of the United States. At the present time there are four commercial plants for production of electrolytic zinc in the United States and one in Canada, with a total production capacity of about 300 tons of zinc per day. One plant has been built in Australia and two in Tasmania.

The secret of successful electrolytic precipitation is to precipitate the zinc from a pure electrolyte. Sheet lead anodes and sheet aluminum cathodes are used. The zinc is stripped from the aluminum cathode and melted for casting into ingots. The power consumption in one plant is as low as 1.7 kw-hrs. per pound of zinc precipitated. In others it is as high as 2.5 kw-hrs, per pound of zinc. In one plant three-phase current is delivered at 44,000 volts, transformed to 2,300 volts, and converted to 250 volt direct current by synchronous motor-generator sets. Sixty cells are connected in series, with the voltage per cell 3.5 volts. The installed transformer capacity of electrolytic zinc plants in the United States and Canada is about 60,000 kv-a.

A large 1,000 kw melting furnace of the carbon resistor type was put in operation in 1919 for melting the zinc cathode of an electrolytic zinc plant. In the first weeks of operation the furnace melted zinc with a power consumption of 70 to 80 kw-hrs. per ton of metal charged and a metal loss in dross of 0.024 per cent.

Although there has been considerable experimenting in the United States and Canada during the past ten years on electric smelting of zinc ores, nothing has been done in commercial production. Electric smelting of zinc ore and dross has been practiced commercially in Sweden since 1901. Two plants are in operation in that country of a total transformer capacity of 15,000 kv-a. A large part of this capacity has been used for smelting dross. When smelting ore the main difficulty has been in production of blue powder instead of zinc. Single-phase furnaces of 350 to 750 kv-a size are used. Although the blue powder difficulty appeared practically solved by experimenters in the United States several years ago, nothing commercial has resulted.

The use of electricity in metallurgical processes for treatment of ores is certain to increase slowly. The operation of the Anaconda plant has shown that zinc can be produced electrolytically at a profit with zinc at its normal price. Electrolytic plants will probably prove most successful in large units, and the growth will be toward a few large installations rather than a few small ones. All of the plants erected to date use central station power. These plants give an excellent load of high load factor and high power-factor.

Gold and Silver.

Electrolytic refining of gold and silver bullion has been practiced for a number of years in the United States mints at Philadelphia, Denver and San Francisco, and the New York assay office. It is also used in the refinery of one Perth Amboy smelting plant. In silver refining, an electrolyte of silver nitrate solution is used. In gold refining the electrolyte is a trichloride solution of gold. The power involved in these installations does not exceed 500 kilowatts.

Several electric melting furnaces were installed in United States mints during the war, which proved successful for melting silver dollars, nickel and copper.

Future Development.

Increased load of central stations from metallurgical processes depends on several factors: 1—cost of power; 2—location and freight rates; 3—the price of coal and oil now used as fuels in metallurgical processes; 4—industrial demand for the highest grade metals and alloys. In melting steel and non-ferrous metals and electrolytic refining of metals, a power cost of one cent per kw-hr. is reasonable, but a smelting process or electrolytic reduction process, except when producing the higher priced ferro-alloys, such as ferrovanadium, cannot stand this prices. The smelting furnace operator does not expect the two mill power of Sweden, but in most cases he must have five mill power. The cost of power limits the following electrometallurgical processes to hydroelectric power: smelting of iron ore, ferro-alloy production, aluminum, electrolytic zinc precipitation, and electric smelting of non-ferrous ores.

Location and freight rates will have a considerable influence on the substitution of electrical processes for combustion methods. Western foundries will probably be making iron castings by electric melting of scrap iron and steel, or by smelting a mixture of scrap and iron ore instead of by melting pig iron shipped from the east with a $12 to $18 freight rate added to the eastern market price, once somebody has demonstrated the saving possible. Many large western smelters have ceased operation because of high costs and shortage of ore. This may result in installations of electric furnaces for treatment of high grade ores and flotation concentrate.

The price of coal and oil has reached such a point in many western smelting centres, where hydro-electric power is available, that if electric furnaces were developed to a point where they could be substituted for combustion furnaces, substitution of electric furnaces would undoubtedly result. This development is certain to come before many years, if fuel prices remain high, particularly oil.

Modern industry demands high grade products. Even if electric furnace steel costs slightly more than open hearth steel, the requirement of the best steel possible for present day industrial purposes is certain to result in a large increase in the production of electric furnace steels and non-ferrous alloys. This will eventually increase the consumption of electrically produced ferro-alloys.

In summary, a considerable increase of the uses of electricity is to be expected in the following processes:

1—Iron castings from scrap or a duplex process of cupola melting with electric furnace refining.

2—Steel castings and alloy steels.

4—Aluminum.

5—Brass melting.

6—Electrolytic zinc.

7—Electric smelting of non-ferrous ores.

Penalize Poor Power-factors—Bonus Good

A number of Canadian companies are now following the plan of penalizing their customers for poor power-factor. The following item from the Electrical World tells of a company that penalizes for poor power-factor and bonuses for good power-factor:

Power contracts of the properties operated by the American Gas & Electric Company for demands of more than 100 kv.a. carry a power-factor clause whereby a percentage of correction for power-factors above or below 85 is made on the kilowatt-hours used. This correction is applied by means of a table of constants based on the average power-factor for the month. The power-factor provision reads as follows:

The rates in this tariff are based upon the maintenance by the consumer of an average power factor of 85 per cent. for each month as shown by integrating instruments. When the average monthly power factor is above or below 85 per cent., the killowatt-hours as metered will, for billing purposes, be multiplied by the following constants:

Effective Monthly Power Factor	Constant	Effective Monthly Power Factor	Constant
1.00	0.951	0.70	1.0835
0.95	0.965	0.65	1.1255
0.90	0.981	0.60	1,1785
0.85	1.000	0.55	1.2455
0.80	1.023	0.50	1.3335
0.75	1.050		

Constants for other than the effective power-factors given in the table are determined from the same formula used to determine the given constants.

Thus for an average power factor of 85, which is taken as standard, the customer will be billed for the amount of energy consumed as shown by the kilowatt-hour meter. But when the power-factor is below or above 85 the metered kilowatt-hours are multiplied by the constant corresponding to the power-factor. For example, suppose that the true energy used during the month was 100,000 kw-hr. and an average power-factor of 75 was maintained. Multiplying 100,000 kw.-hr. by 1.050, the constant for 75 per cent. power-factor gives 105,000 kw-hr. for which the customer could be billed. Had an average power-factor of 95 been maintained, the constant 0.965 would have been used and the bill rendered for 96,500 kw.-hr.

In this manner the customer is penalized by the correction of the energy consumption to conclude a portion of the reactive volt-ampere-hours when the power-factor is below 85 and compensated for maintaining a power-factor above that point. This method has the advantage of being applied directly to the metered kilowatt-hours, where it belongs, and does not take the form of a discount or addition to the bill after the demand and energy changes have been computed regardless of power-factor.

Can Niagara Falls Be Further Developed Without Interfering With Its Scenic Beauty?

An Opinion by Col. J. G. Warren in the Electrical World —While He Views the Situation as a Citizen of the United States there is Much in it of Interest to Canadians

The destruction or serious defacement of Niagara Falls, or any part of it, for power development or commercialization of any kind would be held almost universally — and should be beyond doubt—to be intolerable vandalism. However, there is much to be said in favor of Niagara power and its great benefits to the United States and to the world. The development already existing has made possible the growth in this country of chemical industries so important that it is difficult to see how they could possibly be dispensed with. It might almost be said that the war could not have been won without them. It is true also that some of the hydro-electric developments now existing at Niagara Falls furnish a spectacle of beauty, grandeur and sublimity almost rivaling the falls and the rapids themselves. The problem is to develop a policy which will insure preservation of the natural scenery and at the same time conserve the present power development and provide for future industrial needs.

On first thought it would seem that no harmony between these objects was possible, that power development must give way to scenic preservation. A careful study of all the facts makes it clear that this is not the case; that the utmost harmony can readily be made to prevail between the two apparently conflicting interests, and, strange as it may at first seem, that scenic preservation may be promoted by a further development of power with its greater enhancement of commercial advantages.

This very satisfactory conclusion arises because of the peculiar character and growth of the Horseshoe Falls. Although they discharge sixteen times as much water as the American Falls and have a crest line two and six-tenths times as long, yet they are often held to be inferior as a spectacle to the lesser American Falls. The crest line forms a deep curve which makes it impossible to see more than about one-half of these falls at a time except from one viewpoint in Canada. In the central 1,000 ft. (300 m.) of the crest line, situated deep in the curve, more than 80 per cent. of the flow over the falls plunges down over the cliff behind a thick cloud of mist. This part of the water fall is seldom more than partly visible, and then only under favorable conditions of wind, causing the spray to be blown to one side. It seems to be a fact that perhaps more than one-half of the water flowing over this cataract adds nothing at all to its grandeur, unless it be by increasing the volume of sound, while it greatly injures the scenic effect by causing a cloud of spray which hides a large portion of the falls almost perpetually. The ends of the crest line are never well covered with water and frequently are bare.

One remedy would be to construct a submerged dam or weir in the centre of the rapids just above the crest or Horseshoe Falls. This would spread the water away from the centre onto the ends, thereby checking centre erosion and enhancing the beauty of the falls. With this done the inequality of flow over the two falls could be partly remedied without detriment to the Canadian Falls by dumping rock into the river to form a low submerged weir between the upper end of Goat Island and the Canadian shore.

If the remedial works whose design has been outlined above are provided, it is believed that a total diversion of 80,000 sec.-ft. (2,240 cu.m. per second) may be made around the falls and 40,000 cu. ft. (1,120 cu.m.) per second around the Whirlpool and Lower Rapids without injury to the scenic beauty and without injury to the ice-discharging capacity of the falls or rapids, these diversions to be divided equally between Canada and the United States. After these diversions have been effected, it is quite possible that observation will show that further diversion is permissible, especially should the possibility of utilizing further diversion at medium or high stage only be considered.

The effects at low-water stages are the critical considerations. Under the very infrequent condition when the total river flow is 130,000 cu.ft. (3,640 cu.m.) per second, the flow over the Falls would be 50,000 cu.ft. (1,400 cu.m.) per second, of which 5,000 cu.ft. (140 cu.m.) would pass over the American Falls. The flow over the Horseshoe Falls would then be about twice as great per foot of crest line as the flow over the American Falls under average conditions and more than three times as large as during this very abnormal low-water condition. This 45,000 cu.ft. (1,260 cu.m.) per second flowing down the rapids above the Horseshoe Falls would provide 50 per cent. more water per foot of width of channel than past experience has shown to be necessary in the American channel leading to the American Falls for the prevention of ice jams. The possibility of dangerous ice jams forming in the Whirlpool Rapids or Lower Rapids appears much greater than in the rapids above the falls.

It is very important also that the scenic beauty of the lower rapids should not be injured at very low stages. A careful study of photographs, profiles, gauge records and other evidence leads to the conclusion that the diversions around these rapids should be limited to 40,000 cu.ft. per second until the effects of this diversion can be observed.

In the attempt to operate large hydro-electric plants very close to an authorized limith of diversion, occasional accidental peak loads may cause an unintentional overstepping of the limit. If these are not permitted, the plant must habitually be operated at less than the allowed load, thus reducing the total output of power. For this reason it would seem that the treaty and the permits issued under it should not penalize such occasional accidental excess diversions.

Extent of Territory Involved.

The territory involved in a comprehensive consideration of this diversion is the entire drainage area of the Great Lakes above St. Regis, N. Y., 66 miles (106 km.) above Montreal, the place at which the St. Lawrence passes entirely into Canada. This area is approximately 300,000 square miles (768,000 sq.km.), of which 59.5 per cent. lies on the United States side of the international boundary line. The total area is somewhat larger than that of Texas and about one and one-half times the size of France. The land area on the United States side includes virtually all the State of Michigan and portions of Minnesota, Wisconsin, Illinois, Indiana, Ohio, Pennsylvania and New York. The land area on the Canadian side comprises a large part of the Province of Ontario. The water surface alone is 95,205 square miles (243,725 sq km.), or 64 per cent. of this is in the United States. The main shore line involved exceeds 8,300 miles (13,350 km.) in length. The

TABLE I—COMPARISON OF CONSTRUCTION COST AND TIME OF DEVELOPMENT, PROPOSED NIAGARA RIVER DEVELOPMENTS OCTOBER, 1918

	Cu. Ft. per sec	Gross Head, Ft.	Net Head, Ft.	Total Hp. on Busbars	Hp. per Ft.-Sec.	Construction Cost	Construction Cost per Hp.	Time of Development Years First Power	Time of Development Years Complete
1. Power canal	20,000	313.8	302.8	591,000	29.6	$43,579,000	$73.70	2½	5
2. Pressure tunnel..	20,000	312.5	301.3	588,000	29.4	50,803,000	86.40	3	5
3. Tailrace tunnel	20,000	312.5	299.0	584,000	29.2	52,220,000	89.40	3	5
4. Simple two-stage..	20,000	312.2	297.5	580,000	29.0	61,227,000	105.60	2	4½
Upper stage only	20,000	215.2	208.2	406,000	20.3	31,528,000	77.73	2	4½
Lower stage only	20,000	87.0	89.2	174,000	8.7	29,699,000	170.78	2	4¼
5. Compound two-stage	20,000	312.0	298.4	573,000	28.6	55,481,000	96.80	1	4¼
Upper stage only	20,000	219.0	214.4	409,000	20.4	21,183,000	51.80	1	3¼
Lower stage only	20,000	93.0	84.0	164,000	8.2	34,298,000	209.10	2¼	4¼
6. Ship canal									
300 ft. wide, 40 ft. deep...	20,000	316.4	312.9	611,000	30.6	198,412,000	324.70	7	10
400 ft. wide, 30 ft. deep...	20,000	316.4	312.9	611,000	30.6	203,000,000	332.20	7	10
200 ft. wide, 33 ft. deep...	20,000	316.4	309.9	605,000	30.2	170,000,000	281.00	6	9
Portion of works of 300-ft. canal necessitated by the power development.						93,000,000	97.50	7	..
7. Erie and Ontario sanitary canal	26,000	326.4	310.2	787,000	30.3	401,760,000	510.50	..	..

population of the basin area is estimated to be 15,000,000, of whom 2,000,000 are in Canada. At least sixteen cities of 50,000 population or more each are contained within its boundaries.

The total developable water power of the basin is estimated at 10,000,000 h.p., far more than half of which is in the United States. The water power already developed within this area is roughly 1,000,000 h.p. in the United States and 1,500,000 h.p. in Canada.

Present diversions of water from the Niagara River at Niagara Falls for power development are given in Table IV. Since the above data and Table IV were compiled the Hydro-Electric Power Commission of Ontario has constructed an addition to the Ontario Power Company's plant increasing the diversion of that plant to about 13,300 cu. ft. (378 cu.m.) The commission also has under construction a new plant to utilize a diversion of 10,000 cu.ft. (280 cu.m.) of water per second under a head of 300 ft. (90 m.) All the other plants enumerated generate power under gross heads of 220 ft. (64 m.) or less, diverting water from the river not more than 1¼ miles (2 km.) above the falls and returning it to the river within less than a mile (1.6 km.) of the foot of the falls.

Possible Methods of Development.

Consideration of several plans for the further development of power from the Great Lakes drainage basin by the diversion of additional water from the Niagara River have shown the feasibility of three major types of development: (1) By a power canal, (2) by a pressure tunnel and (3) by a tailrace tunnel. Four other developments have also been investigated (see Table I), but all of them are higher in first cost and more complex in engineering requirements. All the proposed schemes are predicated on the ability to secure more diversion—20,000 sec.-ft.—through international agreement. The power-canal development would involve diverting water just south of Connors Island and conveying it to a power plant below Riverdale cemetery where the draft-tube discharge elevation would be low enough to give 312.5 ft. (95.1 m.) gross head. The pressure-tunnel plan would require an adit just upstream from Grass Island and would run to a plant situated similarly to the one first mentioned. The tailrace-tunnel plant would involve a plant just upstream from Grass Island with a gross pressure head of 299 ft. (91.1 m.) and a tailrace tunnel extending to the lower river, raising the gross head to 312.5 ft. (96.5 m.). The two-stage developments are based on utilizing the total head in two steps of about 215 ft. and 97 ft. (65.5 m. and 29.5 m.) respectively, one plant being near the International Bridge and the other in the lower river. The simple two-stage development differs from the compound in that it contemplates an entirely new development for the use of diversion authorized by a new treaty, while the compound two-stage development is a scheme for the most efficient use of the existing diversion, utilizing the more modern portions of the Niagara Falls Power Company's present plant. The other propositions are indicated by their name.

TABLE II—ESTIMATED ANNUAL CHARGES FOR POWER DEVELOPMENT, EXCLUSIVE OF FIXED CHARGES ON ORIGINAL OVERHEAD AND DEVELOPMENT EXPENSES

Based on use of a diversion of 20,000 cu. ft. per second
October, 1918

No.	Proposition Name	Ninety per Cent of Maximum Continuous Output in Horsepower	Fixed Charges per Horsepower per Year	Operation Charges per Horsepower per Year	Cost of Power on Busbars per Horsepower per Year
1	Power canal	532,000	$8.20	$1.80	$10.00
2	Pressure tunnel	529,000	9.60	1.70	11.50
3	Tailrace tunnel ..	526,000	9.90	1.70	11.60
4	Simple two-stage .	522,000	11.70	2.20	13.90

TABLE III—COMPARATIVE COST OF STEAM AND HYDRAULIC POWER AT NIAGARA FALLS, N. Y., OCTOBER, 1918

(20,000 cu. ft. per second; 526,000 h.p.)

	Cost in Dollars per Hp.-Yr. Steam-Electric	Cost in Dollars per Hp.-Yr. Niagara
Coal, 6 tons at $4.50	$27.00	$ 0.00
Other operation and maintenance	8.00	1.90
Fixed charges (Niagara, 10 per cent; steam-electric, 13 per cent.)	12.60	14.00
Profit, 3 per cent. on construction cost	2.90	3.10
Selling price	$50.70	$19.00
Selling price (reduced to cents per kw.-hr.) ..	.78	.29
Saving per hp.-year	.....	31.70

From the tables it will be seen that the first cost of the canal proposition, omitting costs of promotion and finance, is lower than that of either tunnel proposition, being $73.70 per horsepower as compared with $86.40 and $89.40 for the tunnels. The cost of operation and maintenance would, however, be greater, but upon the asumptions in the estimates not enough to overbalance the additions in fixed charges. The tailrace-tunnel plan has several inherent disadvantages which make it of very doubtful advisability. These are the expected presence of considerable ground water in the low-level tunnel during construction, the difficulty of unwatering the tunnel in case of accident or needed repairs and the difficulty of regulating surges in the tunnel. The most important objection to the tunnel plan is that it will be necessary to shut down the entire plant for a short time and drain the tunnel in order to repair or remove obstructions from the upstream valves. This difficulty is not regarded as controlling. It could be obviated by extending the tunnel up to a surface forebay and using long penstocks, or by other means. The only formidable objection to the power-canal plan is the presence of an open canal through or near the city and the uncertain costs of maintenance due to climatic conditions. There is no reason, however, why it should not be made less unsightly than the present canal, and in fact it might even be attractive in appearance. It would, however, partly prevent the use of valuable land for other purposes, would form a dividing line disadvantageous to streets and sewer systems, and would cause the city or the company expense for building and maintaining bridges as the city grew.

A comparison of the portable cost of power at the busbars corrected to equalize distribution conditions shows that the power-canal project should show a cost of $10 per horsepower per year, as compared with $11.50 and $11.60 for the pressure and tailrace tunnels respectively.

Objections to the scheme of the Erie & Ontario Sanitary Canal Company of diverting more water from Niagara River are that all of the roads leading into Buffalo from east, west and south would be crossed. This would require about seventy movable bridges, and the consequent obstruction to traffic would be enormous. It would lower the level of Lake Erie 1.18 ft. (0.4 m.), and remedial works would be very expensive. Besides, it would produce excessive currents in the Black Rock ship canal, and there would be difficulty in crossing the New York State Barge Canal.

TABLE IV—WATER DIVERSION FROM NIAGARA RIVER AT NIAGARA FALLS

Side of River	Name of Company	Diversion Cu. Ft. per Second	Totals
United States.....	The Niagara Falls Power Co.:		
	Niagara Plant	8,600	
	Hydraulic Plant	10,900	
	Pettebone Cataract Paper Co. ...	270	19,770
Canada...........	Hydro-Electric Power Commission of		
	Ontario Power plant	11,200	
	Toronto Power Company	12,400	
	Niagara Falls Power Co., Canadian Plant	9,600	
	International Railway Co. .	125	33,325
Grand Total			53,095

Electric Tube Transmitter

The Deparatament of Commerce, Bureau of Standards, Washington, has prepared a scientific paper (No. 381) entitled "Electro Tube Transmitter of Completely Modulated Waves." In order to utilize a radio-frequency wave train of given power most effectively in a non-oscillating receiving system it must be completely modulated at some suitable audio-frequency. A convenient way of accomplishing this modulation when an electro tube generator is used, is by supplying the plate circuit of the tube or tubes with an audio-frequency alternating electro-motive force.

An alternator may be used with suitable transformers to supply both the filament and plate circuits. A self-contained transmitting set of this type has been designed at the Washington Bureau of Sandards and a description of the set, with photograph and diagrams, is given in Scientific Paper No. 381. Overall efficiency as high as 35 per cent. is obtained with the set. Transmission and reception tests are described in which the waves were received as heterodyne methods and also with crystal detector. A copy of the paper may be had on request to the Bureau.

The Crouse-Hinds Co. of Canada have prepared a number of interesting mailing cards showing the use of condulets on washing machines. The series of cards is entitled "Conduleting a Washing Machine." The Crouse-Hinds people are also applying the same idea to an electric ironing machine. It is understood that this firm is the first to apply condulets in this way. In view of the correspondence which has appeared recently in the Electrical News regarding the hazard of switches on washing machines, this application of condulets is of more than usual interest.

The C. G. E. Co. have been granted a building permit for the erection of a new factory on the corner of Wallace & Ward Aves., Toronto.

Fire Hazards and Best Means of Eliminating Them

At a recent meeting of the Executive Committee of The Society for Electrical Development, the general manager, Mr. J. M. Wakeman, was instructed to take up with manufacturers the question of educating the public in regard to the necessary safeguards in using electrical appliances, and also with advertisers the importance of more carefully scrutinizing their advertising copy, to ask them not to show appliances attached to lamp sockets which are not suitable for such use, and to avoid showing impossible combinations of appliances upon onesocket.

Regarding the agitation now going on regarding the necessity for warning the public against electrical fire hazards, the president of the National Board of Fire Underwriters has suggested that the public be so educated; it is suggested that every central station might profitably include in its commercial policy a definite campaign of education on the elimination of electrical fire hazards; various authorities have expressed themselves upon this subject, and it was suggested that the Society take the question up and warn the people against unsafe electrical devices or the misuse of electrical appliances, pointing out the fire hazards as well as the personal risk attached to such misuse.

Inasmuch, however, as the Society is engaged in the education of the public to an appreciation of the uses of electricity and is developing a demand for electrical appliances, at the same time educating the industrial executives upon the advantages of the electric motor for power purposes, they felt that it would be undesirable for the Society to strike a note of warning or alarm which would to some extent clash with the work already done. The committee, therefore, decided to ask the manufacturers themselves to conduct a positive campaign of education on the proper use of electrical appliances, which campaign could be carried on in their advertising space, by tags attached to devices themselves, or by little folders on the subject. It was felt that this could be left in the hands of the manufacturers, in that they could be trusted to direct people in the proper use of appliances without alarming the public or saying anything which would tend to discourage the purchase and use of the devices they are offering for sale.

In regard to the other question of showing unsuitable devices attached to lamp sockets, there have been a great many illustrations used in the advertisements of some manufacturers, in which they show electrical appliances attached to lamp sockets which really require special outlets, and there has been considerable advertising done, showing such combinations as an electric range and a vacuum cleaner, a washing machine and an electric motor for domestic use, an ironing machine and sewing machine, an iron and an electric heater taken off the lamp socket. Such combinations cannot with safety be used simultaneously from a 250 watt key socket, and advertising of this character is apt to result in the misuse of electrical appliance. The burning out of sockets and the troubles thus arising retard the ultimate sale of appliances or cause the disuse of those already purchased.

We quite agree with the opinion of the members of the committee that manufacturers and others will avoid the use of such illustrations if their attention is called to them and the ultimate injury to the electrical industry pointed out.

A. Laurin, 21 Hillcrest Park, Toronto, will receive tenders for the electrical work on the new church at the corner of Dundas & Edna Sts., Toronto.

The Qualities and Applications of Asbestos in the Electrical Industry

Of the many insulating materials on the market today, one of the best known, both thermal and electrical, is asbestos. It is the purpose of this article to discuss this material in its various forms, qualities and applications in the electrical field.

Insulating materials may be said to have four distinct forms, viz: solid, plastic, liquid and gaseous, this being the physical classification. They are also classified according to their application, as:

1. Wire and cable insulation.
2. Insulating supports wherein mechanical strength is included.
3. Coil and slot insulation for motors and generators.
4. Insulators in slabs, sheets and as arc deflectors.
5. Moulded insulation wherein heat and pressure are applied to obtain certain forms.
6. Filling compounds such as paints and varnishes.

Since this article is to deal with asbestos as an insulating material, we ought to understand what the composition of asbestos really is. Asbestos is a mineral fibre, composed of hydrous silicate of magnesia. Asbestos is a great thermal insulator, melting at from 1200 to 1300 degrees centigrade. This makes it a very valuable product, especially when combined with other compounds to give it mechanical strength. Frequently, we find it combined with binders which not only give mechanical strength but also make it less susceptible to moisture. These two qualifications make it valuable as an electric insulator.

The commercial varieties of asbestos contain many impurities (chief of which are the iron compounds) which, when combined with it, greatly depreciate its value as an electrical insulating material. However, when these impurities are removed the asbestos fibre makes an excellent insulating material for certain classes of electrical work.

Uses for Electrical Work

1. In the use of asbestos for wire and cable insulation, the very best of the asbestos fibre is used. This fibre is treated by a special process which removes all impurities. It is then applied to the wire in a uniform and smooth mass and is finally treated with compounds which make it moisture proof and give it mechanical strength. Such classes of wire and cable are used in wiring motors, both mining and railway, and in various classes of switchboard work. Other uses are found for this make of wire, but these are the principal ones.

2. Next we find asbestos used in the manufacture of asbestos board of lumber which is used for many and varied purposes. It is made up into a fireproof sheet by treating with certain compounds and putting under great pressure. It can then be handled much as lumber and can be sawed, nailed, chiseled or planed, and takes a good oil, painted or varnished finish. It makes an excellent substitute for marble, slate and hard rubber, and is used extensively in the manufacture of high tension insulating materials, as insulators between phases and as arc deflectors. In this form it is also extensively used in the manufacture of cabinets and in panel box work.

3. Asbestos is used in the manufacture of many different kinds of tapes. These tapes are used in winding all sorts of coils, such as magnet coils, field coils, for insulating armatures, etc. The writer recently had the pleasure of going through one of the largest plants manufacturing control apparatus on the continent. In this plant there was one department which was given to the manufacture of lifting magnets. These magnets have great coils wound from ribbon copper, each layer of which was insulated from the next by asbestos tape. Upon inquiring into the reason for the use of this particular type of tape, I was advised that tthe insulation required for this work had to be not only of great dielectric quality but also had to give thermal protection, hence the use of asbestos tape. This tape is formed for the most part from the purified asbestos fibre and is pregnated in order to give it mechanical strength. It is far superior to cloth or paper tape in that the thermal resisting qualities are so much better. Heat being one of the greater factors to be contended with in electrical control apparatus and generating equipment, it is quite essential that the coils be well protected from any undue deterioration and breakdown caused by heating. The better grades of asbestos tape will stand approximately 275 degrees centrigrade raise before breakdown occurs, and also 250 volts puncture test.

The tape is manufactured in various thicknesses, but the heavier listing is used principally in underground systems for the purpose of preventing spread of fire in case of short circuits or burn-outs.

4. Asbestos is also used in the manufacture of moulded forms. While visiting the above mentioned factory, the one department in which I was vitally interested was that in which these moulded electric parts were made. Here we found all forms of moulded insulation made, from the smallest parts found on automobile lamp sockets to large rheostat backings. All were pressed forms, manufactured under hydraulic pressures which varied from five to seven hundred and fifty tons. Some were polished and became a finished product while others were pregnated and baked to give them greater mechanical strength. There were hundreds of forms and shapes, including lamp sockets, switch parts,—all shapes of arc deflectors, mountings for heating elements, resistance mountings and even radiator caps for automobiles. In all the various compounds a large percentage of the foundations of the composition was asbestos.

5. Lastly, we find asbestos used in certain paints, varnishes and fillers used in electrical work. While not as extensively used in this form, nevertheless it forms a basic foundation for many good insulating compounds. As a thermal insulator it is without a peer, it being used in unlimited places for this purpose, and while its use as a thermal insulator is far more extensive than as an electrical insulator, the time is not far off when both uses will be about on a par, as engineers the country over are constantly improving and working with the asbestos fibre to make a better insulator out of it and to improve it for electrical purposes.

National X-Ray Reflectors

Following their practice of supplying architects with working information on lighting applications, are presenting a new series of detail plates. The subjects presented are:—

Plate No. 53—Residences. Restful illumination is easily combined with artistic fixtures in the X-ray indirect lighting system.

Plate No. 54—Display Rooms. A novel method that has advertising value, and gives a quality of illumination especially suited to the interior.

Plate No. 55—Offices. X-ray indirect lighting adds distinction to any office and increases the efficiency of the employee.

Plate No. 56—Clubs. An example of beautiful, dignified lighting for a richly appointed club.

Electric Railways as Popular Investment Securities

Sub-Committee of Investment Bankers' Association Thinks Will Again Attain Their Former High Standing

The real question as to the security of electric railway investment is not to be answered by the income statements they have shown. Electric railway securities are a good example of the kind of investment that has suffered most, for the present, from the war's effects. High labor costs, high material costs, high capital costs, combined with a low price for the product, transportation, could not possibly result in anything but discouraging statements. Since electric railroads perform a public service and are subject to regulation, they have not been able promptly to adjust the prices for their product to the cost, as competitive industries have done. Financial statements may indicate the progress that is made in readjustment, but sound judgment as to the real worth of investments in electric railways must go much further.

The Questions at Issue.

Intelligent judgment of the future worth of street railways must be based upon the answers to such questions as the following:

Will there continue to exist a sufficient demand for the kind of transportation service that electric railways have furnished?

Is the automobile supplying this service and will it gradually supply the greater part

Is it possible to charge fares that will pay the operating costs and leave sufficient margin to attract capital?

If there are fares that will do this will the public consent to the increase?

The mere putting of these questions suggests what is actually taking place. The sheep are rapidly being separated from the goats. Unquestionably there are roads, particularly small suburban and interurban lines, which, due to local conditions, are finding that the automobile has taken away sufficient traffic to make the remainder much too small to keep the line alive with any fare possible to collect. It is usually true, however, that these lines are the very ones that were unprofitable even when all conditions were favorable. The first effect of the discovery that there are electric railways that cannot be successful is to create doubt that any can be successful, but so superficial a view is sure to be modified and the credit of sound roads is likely to be benefited through a confidence that is the result of intelligent analysis and real conviction.

There is a widespread feeling that since the advent of the automobile the electric road has lost a large part of its traffic. Studies of traffic statistics do not bear out this supposition. There has been a great amount of transportation created by the automobile and it has absorbed a part of the normal increase that would have come to the electric roads, but in city systems particularly studies show that with considerable uniformity electric roads are carrying many more passengers than they did ten years ago, or even five years ago, and are even furnishing many more rides per capita. In many cases this increase has occurred in spite of little increase in facilities because of the difficulty in attracting new capital.

Traffic Increasing Despite Automobiles and High Fares.

In the great majority of places there is every reason to believe that the answer to the first and second questions will prove to be that there will continue to exist a sufficient demand for the kind of transportation service that electric railways have furnished and that the automobile, through subtracting something from what the electric road might have had, will not prevent the electric car business from growing.

Even a very large and a growing business will not bring prosperity with low fares. Costs of everything have about doubled. Doubled fares would be not more burdensome than items every one is meeting at every turn, and very many riders have twice the wages with which to meet them If doubled fares were paid with the readiness that has been shown in retail purchases, it is safe to say that the street railway business generally would be more prosperous than it has even been before.

Improvements in operation, however, the use of the light one-man car, the betterment of station efficiency and all the economies stimulated by adversity have made it possible for roads to approach a prosperous condition with considerably less than doubled fares. There was fear at first that increased fares would so reduce the riding that it might not be possible to charge the fare necessary to pay the operating costs and leave sufficient margin to attract capital. This fear is fast disappearing. Agitation and the stimulation of discontent with the increase do of course prevent the full benefit that might be obtained, but the experience has been that though there is at first a considerable decrease in riding when fares are increased the passengers carried gradually tend toward the number that rode before the increased fares were put into operation.

Whether the public will consent to the increasing of fares seems to be largely a question of the political advantages there may be in opposing the increase, and these political advantages depend very largely on local street railway history and the public relations established by the management. The modern street railway operators through frank disclosure of all the facts and a courteous attitude toward the public and its representatives do much to remove old-time prejudices and to secure local and official support and fair treatment. The state commissions for the regulation of public utilities have very generally granted increases and there is a formidable list of cities with fares of 6, 7, 8, 9 and 10 cents now in force. In fact the cities where fares have not been increased above pre-war levels are in a rapidly dwindling list.

Ultimate Benefit From Present Trouble.

It is not unlikely that in the end many electric roads will be found to have benefited from the very severity of the blow they have received. For many years before the war electric roads were suffering from their burdens. Costs had even then risen considerably and returns on capital were low, there were constant importunities to build extensions and to add service, taxes were increasing steadily and paving burdens were laid wherever possible. The popular belief that the roads were enormously profitable was so strong that no denial was credited and regulating bodies seemingly dared not judge street railway situations on their merits because of the preconceptions of the public. The last six years have dissipated the fiction. It has become plain to the dullest that a public franchise has no peculiar power to produce surpluses from deficits. The unwillingness in some cases to abandon lines, in others to sell to municipalities, in others to rest in the arms of receivers, have convinced the public at last that, like any other business, there are investment costs, receipts and operating costs, and that these are all determinable. Many state commissions have not only listened without bias to the street railway rate cases but in their decisions have admirably set forth the principles that should be followed in future treatment. The rate cases have established values which from now on will serve as starting points. Service-at-cost franchises are being worked out that will assure the security of the investment and regulate fares so that they will be no more than necessary, but still sufficient to keep the business healthy and progressive.

Your committee hardly looks for spectacular improvement in street railway credit or sudden rise in the values of their securities, but it believes that the change in the public attitude toward the business, the constructive work being done by the commissions, the clearness with which the basic facts of the business ae coming to be understood are all working toward secure conditions for the industry and will result finally in income returns which even though moderate will, by their steadiness and surety, give again to electric railway securities their high investment standing.

Montreal Tramways Employees Accept Arbitration Award

Service at Cost Working Out Well—Tendency to Place Management at Mercy of Employees

The force of public opinion has been too strong for the Tramways Union in Montreal. The men made a demand for a further increase in wages, and also for conditions which were generally considered as impossible. The Tramways Commission, the company, and the men, after negotiations, agreed to go to arbitration. The result was an award which fell far short of the demands, but which increased the pay to 45c, 50c and 55c an hour for first, second and third year men respectively. Although the award was concurred in by the men's representative, the Union rejected it and threatened to strike.

Further negotiations followed, and it became clear that a strike would not receive the public support. The men therefore agreed to accept the award for the sake of "avoiding suffering to the public," according to the Union statement.

An additional sum of $800,000 will be needed to carry out the award, so that a further increase in fares is inevitable. The company has been hard hit by the increase in the cost of material and the higher wages, and owes the city large sums for rental of the streets.

The result of the increases in wages is a small addition to the fares. Tickets are now sold at the rate of four for twenty-five cents instead of five for thirty cents, the increase thus being one-quarter of a cent per ticket; the cash fare, however, continues to be seven cents. Tickets by the book are sold at the rate of fifty tickets for three dollars, instead of at the rate of forty-four tickets for two dollars and fifty cents.

The Tramways Commission in its annual report, states that the deficit of the company for the year ending June 30th, was $1,728,811, but this includes a deficit of $1,364,111, carried over from the previous year. The receipts of the company totalled $10,782,470, while the operating expenses were $5,849,911.

The Commission points out that at the end of the first year's operation, after the contract, the gross receipts were sufficient only for the operation expenses and taxes, the cost of maintenance and renewals and a part of the interest on the capital invested. For the second year, ending June 30th, 1920, the result was much better, and there was sufficient to pay operation expenses and taxes, maintenance and renewals, all the interest on capital invested, original and additional, and also $120,212 for financing expenses out of $432,784, which should be provided. In view of this improvement, the Commission believes that next year it will be possible for the company to commence making papments to the city.

Commission Appointed by President Wilson Says "Franchises Should Not be Granted, Nor Fares Fixed, for Stated Periods"

The Federal Electric Railway Commission appointed by President Wilson at the request of the Departments of Commerce and Labor in May, 1919, has just handed in a report which contains suggestions of many reforms that are necessary to make electric railway service profitable, and at the same time acceptable to the public. Among the recommendations are the following. It is worth noting that the Service-At-Cost system in operation in Montreal is cited as the most satisfactory and equitable arrangement:—

1. Service at cost on all the electric railway lines on a basis similar to that now in operation in Cleveland, Cincinnati, Dallas, Montreal and other cities.

2. Providing rides at cost, which plus a guaranteed fixed return to the investor on an agreed valuation shall govern the rate of fare.

3. Private ownership and operation should prevail unless the results under private ownership prove unsatisfactory, but the right of the public to own and operate all public utilities should be recognized.

4. Employees should have a living wage and humane hours of labor and working conditions, and a right to deal collectively with their employers, through committees of their own selections. All labor disputes should be settled voluntarily or by arbitration and the award should be final and binding on all parties.

5. Street railway managements should recognize that their first duty is to serve the public with the highest efficiency at the lowest cost.

6. Extensions into outlying territory benefiting private property should be made by assessments on such property and the cost of the same should not be included in the total valuation of the railway system upon which a profit is guaranteed.

7. Franchises should not be granted for a fixed period. Neither should fares be fixed for a stated period.

8. The report estimates that from $175,000,000 to $200,000,000 new money must be provided each year to properly carry out the future needs of the industry and emphasizes that unless credit is restored and co-operation between the public, the management and employees is established chaos confronts the industry.

W. E. R. Fares Now Seven Cents

The Public Utilities Commissioner of Manitoba, Mr. P. A. McDonald, has authorized an increase in the cash fare on the city lines of the Winnipeg Electric Railway System to seven cents. Four tickets will be sold for twenty-five cents. This is an increase from a cash fare of six cents, nine tickets for fifty cents, and workmen's tickets, good during limited hours, at five for twenty-five cents. The workmen's tickets have been abolished. The price of children's tickets, which was formerly eight for twenty-five, remains unchanged. Certain increases are also authorized in suburban fares.

Replacing "Battery" with "Safety" Cars

The Third Avenue Railway, New York, which has been operating some fifty cars for the past three or four years with storage batteries, have now changed these over to one-man overhead operation at 550 volts.

The Contractor-Dealer

What Value Do You Place On Your Association?

Your Duty Goes Further Than Just "Joining." Make It Part of Your Business. If You've Never Got Anything Out, It's Likely Because You Never Put Anything In

Some men seem to have the idea about their associations that all they have to do is "join." It never seems to enter their heads that they have just as much at stake as the other members, just as much right to see that the association is successful, just as much need to roll up their sleeves and do some good hard work.

In days gone by it was easy enough to find men who said that associations were no good to them. That day, of course, is passed. It is fully and universally acknowledged, that some associations have done great good, and that almost all associations are capable of doing good if they are properly handled. The cause of failure to accomplish results, in ninety-nine cases out of a hundred, rests with the members themselves. "Somebody' falls down—fails to do the essential work—does not put the necessary "pep" into the organization—hangs back for somebody else to come along and tell him what to do. And so dry rot sets in—a terribly hard thing to check.

Now, to the electrical contractor-dealers throughout Canada we want to say—was that "somebody" you Ask yourself about it. The holiday season is passing, and the time of the year for active association work is approaching. Are you going to do any work in your association this winter, or are you going to sit back and expect the other fellow to do the work for you?

There is no denying the fact that your association is next in importance to your regular business. Do you sit back and expect someone else to put "pep" into your contracting and merchandising? Not much! You jump right in—get busy—work like a beaver—and naturally get results. Now can't you, this winter, take hold of your association in the same way. Remember, after your business it comes next; indeed, it it part of your business.

A good, sensible letter appears in the Electrical Contractor Dealer, the organ of the Electrical Contractors Association of the United States, telling what one member of that association thinks he "gets out of it." It is applicable and good reading. Here are some extracts.

I never go into anything half way. I think that is the trouble with many members of co-operative organizations—they are passive members, not active members. For years I failed to appreciate the association, but having joined finally I determined to study it thoroughly, to use every feature it offered me, to attend all the conventions I possibly could, to get acquainted through its medium with men whose success could give me valuable pointers for my own business, and to try to do my share towards developing the association's strength and correcting its weakness as they appeared. In other words, I determined to be an active member, for which I was enrolled.

I received with my membership all of the direct helps which go to each member—the Data and Sales Book, the Labor Data Report, the Bulletin on Estimating, etc., and I put these into immediate use in my office. We had been attempting to keep up a reference index of list of prices and selling prices on our materials; it was an expensive, though essential feature, but at best was never entirely complete or satisfactory. I found that the Data and Sales Book was far more up to date even at that time, and a check which I made of the selling prices obtained with the Data and Sales Book as compared with my own price lists showed an additional profit on my association dues. Also, the cost of keeping up my own incomplete price list was far more than my annual dues.

Using Data and Sales Book.

During the first year I used it I was not entirely satisfied with the Data and Sales Book; many of the lists I felt were out of date. But a study of the situation and correspondence with the National office showed me the reason why—abnormal conditions at that time made it almost impossible to keep up with the rapid changes. Gradually this has bettered until to-day I find the Data and Sales Book invaluable in my business; I keep one on my own desk, used also by my estimator, and a second is kept out in the sales department. One clerk has instructions to see that all sheets are immediately put into the books as they are received, and I hold him responsible for this.

The addition of the Condensed Material Sheets has made the book much more convenient for quick reference. We are using the Data and Sales Book in three of its important uses—as a pricing index, using the suggested selling prices as our basis; as a cost book, my own copy which is used in estimating has the costs kept up to date by our bookkeeper; and as an estimating book, in which we find the data sheets invaluable for reference. We have not used it as a buying index, as we have a special quotation file in our purchasing department, but for a small business the book could well be used for that purpose. Our retail manager is anxious to see added to the book a "Condensed Appliance Section,' which will show the principal appliances and their proper retail prices, and I hope in time this can be worked out.

I have talked with members who claim the Data and Sales Book is of little value to them, but in each case I have found they make no attempt to keep it up or use it. To such it is wasted; but its value when used properly I consider one of my best investments.

Another help which we are using constantly in our estimating department is the Labor Data Report, giving the unit cost on various types of work. This has proven of great value, and though we are now keeping records of our own cost, they check very closely with this report. It has proven its worth far beyond any cost measured by our association dues. I hope in time to see an extension of these tables and the cost data. We have also found the Curve of Overhead as worked out in the Bulletin on Estimating of great value in securing large jobs on a time and material basis, as it has given us a sound position in talking with the larger owners, who themselves thoroughly understand the principles of cost and overhead.

Standard Accounting System.

Last fall we installed the association's Standard Cost Accounting System and after nearly a year's use I can say that no other step which I have ever taken in a business way has done so much to insure my success. It has given me an insight into my business, an accurate "pulse" registering the strength or weakness of each department, and a constant knowledge of our cost and overhead, to which I attribute more than any other thing our steadily increasing profits and success month by month.

I was never an accountant, and I had felt that our "bookkeeping" was answering our need, though more and more frequently I was finding it did not show me many of the things I needed to know. I realized I was carrying a burden of worry which was coming largely from that lack of knowledge. With our Standard Cost Accounting System I have this knowledge instantly available; I have strengthened our weak points, have pushed our more profitable departments, and my time which had been cut into by needless detail and worry is now being directed to developing our retail store, which is growing rapidly into a very profitable part of our business.

Intangible Results.

The real purpose of a National Association is to act as the "voice" of its members in presenting to the other branches of the industry the rights of the contractor-dealers; and to obtain from the other branches recognition of the service of its members as an industrial group, with proper protection through just trade policies and adequate differentials and discounts. Such results could never be attained by any of us individually nor locally; it requires a National influence with a National scope.

We must remember, however, that an association is not a machine; it has no power in itself. It is only the grouping together of many men throughout the country, and its strength is no greater than its members. As I realize that to-day, I regret that I did not add any support to it years ago. If today I can do my part to make other men realize this truth and add their weight to that of the two thousand members now back of the organization, I shall feel that I am really giving active membership.

The "voice" of the association lies in the purchasing power of its members, their influence in the industry as an outlet for the manufacturers' goods. Today I am told our members represent annual purchases of about forty million of dollars. That is a fine—a great advance in strength in the past year. But I do not feel that it is a figure to satisfy us; we should work to make our organization double in membership, with buying power in accordance therewith.

I have heard men say, "If the National Association would only completely solve any one of the big problems facing us, such as preventing the sale of electrical goods through the department stores, etc., it would have no difficulty in getting all the contractor-dealers as members!" Yes, if a nation could win its battles first, it would have no trouble raising an army to march in the parade of the victors! What we need is an army of fighters—soldiers who will stick in the fight until it is won, regardless of the disappointments. That is what I feel the National Association is building up; and there is a pride in belonging to such an organization which I count as a very valuable part of what I receive as [illegible]

What Members Need.

I have attended several of the conventions, and have been fortunate enough to get to two "Goodwin" meetings, and each time have come away more firmly convinced that what we need to do is to spend less time worrying about getting more "support" from the manufacturers, jobbers or central stations, and give more thought to our obligations as contractor-dealers.

I mean that we will get full support from the jobbers when we get together as contractors locally and conduct our own businesses on ethical, businesslike lines, with due regard for cost and the making of adequate profits to provide for a growth in our service to the public in keeping with the growth of the industry. We will get protection from the jobbers and manufacturers and solve the problem of the competing department store, drug store, hardware store, etc., when we awake as contractor-dealers nationally to our obligations as dealers, and give the public the retail stores they should have, backed by the service and high standard which we, as electrical men, are capable of giving. We shall get the better discounts and differentials from the manufacturers, which we rightly feel we must have, when we recognize the full retail service which such discounts imply—adequate local advertising, educational high class window displays, store service in keeping with the class of goods we sell and customers we serve, and an "outlet" to the manufacturer through intensive selling methods adequate to the public needs.

Should All Be Active.

I believe we should extend the spirit of co-operation within our own ranks. Every present member should make it his duty to secure at least one new member for the association. We should scrutinize our local associations carefully and see if we are working along broad lines there which will work for the best interest of the whole industry. Have we accumulated local prejudices, restrictions, high local or state fees or dues, or any narrowing requirement which are holding back the fullest support we should be giving? Are we extending the influence of our local organizations so as to interest and develop all who should be a part of the movement—appliance stores, motor repair men, dealers and small contractors as well as the larger; or, are we confining our local efforts along some narrow, selfish line not in keeping with this new spirit of the industry?

I have studied the reports and records of the National Association work which I have received—its financial statements, its committee reports and executive committee records. I feel that one of the benefits which I receive as a member is to share in the efforts of these succesful men from all over the country who are giving their time and thought and energies on committee work to the solution of the many problems which affect us all. They have the vision to see that we are building for the future, and that the foundation must be established deeply and firmly if the structure is to last. I believe that it is the duty of every member to study carefully every report sent to him and to answer fully, promptly and cheerfully, every questionaire asked. "Active Membership" can include no less a service. Certainly without himself serving no man can expect to criticize the service of others in a co-operative association. "He Profits Most Who Serves Best.'

If I were to sum up in a single statement what I receive in an "intangible" way from my membership, I would say it is the broader viewpoint I have attained of my relationship to my profession, and the strength which is developing in me through association with other men. I count these two things as my greatest dividend from my investment in my association.

I believe it is the duty of every electrical contractor and dealer in the country to be a member of his association, that it may have the strength to accomplish the aims we are all vitally interested in. But, more than a duty, I believe that it is a privilege and opportunity for every electrical contractor and dealer to be a member, and that he must receive far more in return than he puts into his membership.

The Central Station Man as a Merchandiser

Finds It Hard to Break Away from Old Traditions. R. B. Woolley in the Central Station Describes the Situation As He Sees It.

"Did you ever go into a store and have the salesman, or the proprietor step forward and call you by name: 'Good morning, Mr. Blank.' If so, you know what the slight addition of your name after that salutation means to selling. It makes you feel good, doesn't it, to realize that you are known by name; to feel that you are somebody, instead of being merely one of the crowd.

"It is just that way with customers. There are few things that contribute more towards the store's success than such little things as this. You don't have to be blessed with a remarkable memory to do it. It is just a matter of paying very close attention to names, and making it a point to remember them. And the cental station is in a very favorable position to secure names, whereas, other stores can only retain those of old customers—the average shopper in most cases being unknown by name until he or she has become a customer, and the name is on the books.

Know Names of Customers

"Most retail stores make a special effort to secure the names and addresses of all customers—particularly all worthwhile customers. I know of an underwear store in Toledo where the proprietor has a card index record of over seven thousand names, the goods bought over a period dating as far back as 20 years, with some customers, and containing various valuable information as to size, character of customer and so on.

"This proprietor gives his salespeople orders that all hard customers—those difficult to sell—should be referred to him. Too often the clerk, or sales person wrestles verbally, with a particularly obdurate customer, getting further and further into difficulties, whereas by knowing when to switch to another sales-person, or the floor or store head, the sale might have been saved, and a pleased customer added to the list.

Smoothing Out the Wrinkles

"This is a factor in merchandising which the average central station overlooks. Little or no attempt is made to connect the bookkeeping department with the sales force, in the working out of problems such as this of names. I know of one good exception to the rule. I have seen in one company station a man near the discount window in the bookkeeping department, whose duty it is to try to make it easier and quicker to pay bills, and to secure from the line in waiting, bits of in formation on the company's policies. Very frequently, I'm told he gathers some ideas from criticisms let drop by irate, or tired cutomers. This, by the way, was before the company adopted the perpetual meter reading plan. I have seen him stop to chat with a lady, take her out of the line, over to the retail sales department, calling her by name (secured from a peek at her monthly statement, I believe), and sell her an appliance while she waited to make her payment. I have seen him, in cases like this, arrange to have her bill paid while she was being sold the merchandise. It was easy for him to politely inquire of Mrs. Jones, who has been waiting a few moments, if he could be of assistance.' Usually she said he could, that she had been standing, or that she was in a hurry, etc. Then he might ask her to step this way, where she could be seated, while he arranged to have her case attended to. Usually she was seated near a demonstration in process, or near a display of attractive merchandise. She was not importuned at once to buy. And in most cases the woman herself commenced to ask questions, and many sales developed as a result. I have seen the same plan tried out with the "Complaint' department, where every effort was made to make the woman feel 'at home,' while her trouble was adjusted, and sometimes the adjustment, being in her favor, coupled with the courtesy of the adjuster and the fact that she was being sold, without hardly noticing it, while the adjustment was being made, made not only a better friend of the company, but a better customer.

Store Atmosphere

"Store atmosphere is a very intangible sort of a thing, I'll admit. But you know it when you step into the live, progressive store; you miss it in the chill and forbiddingness of the other type. Usually a store is no better than its employees. If they are not interested in the business; if they do not care to try out the better ideas and plans for building store atmosphere, store service, store reputation, then there is little hope for the business. If customers are permitted to roam around without any courteous attention being given them; if they are not made to feel 'at home' under any and all conditions; if they are treated by the clerk or salesperson as though it were a condenscension for that person to wait upon the customer, then there is something wrong somewhere. And usually it is to be found with the manager, or the man in charge. Perhaps back of this is a faulty 'policy' entertained by the very head of the business. If the new business manager does not feel that behind him is the interest and observation of the man higher up, then, he, too, is not as efficient as he should be.

Make Friends of Customers

"In some stores there exists an antipathy toward having clerks receive any recognition from customers. That is, they do not want the salesperson to come in for any attention or interest on the part of the customer—they want the store, the business to come first. They analyze it this way: That if the salesperson leaves, he or she may take with them the business of this or that particular customer. But events prove that it is better to encourage this rather than discourage it. In the central station this is not to be worried about as in other lines where there is more competition. Yet, even if the clerk might leave, and if he or she might go to a dealer or another store where the same goods are sold—the amount of business that might go to that person, in their new connection is not of so much importance as the fact that his or her leaving brought reflection upon the company in other ways, and showed that possibly the company's policy as regards the handling of salespeople to be wrong. I have heard merchants say that than not. They want their people to believe in the house and what it sells. The clerk or salesperson that shifts around a great deal is soon out of the running, and has nobody asking for them by name. Whereas, if the company can impress upon the sales force that its success depends upon them, and their efforts, and show them how, as time goes on, they will be rewarded for their serivces, and how the company wants them to develop individual business—a personal clientaele of good customers who believe both in the store and in the goods, then that company has gone a long way toward success.

Sell Service.

"My personal opinion is that too much stress is laid upon the selling of merchandise; too much encouragement given the salesperson to force the sale, even at the expense of the customer, instead of selling the store and its service. Let me point to a case in question. I mentioned an underwear retailer some time ago. I will point to him again, although the same thing has been said in other stores. He told me that he did not rate or grade his salespeople by the amount of goods they sold in dollars and cents, or numbers of sales, but by the way they upheld the store's reputation, by the number of friends they made for the store, by the spirit and interest they put into their work, and so on. More or less intangible things, but he was content to advance their salaries where he felt they deserved it, on this basis, rather than on the cold matter-of-fact basis of what the balance sheets told him monthly.

Tact and Courtesy.

"Most central stations look at the value of the salesman from the viewpoint of volume and profit—a purely monetary viewpoint. Yet I know a man in one company that has caused more trouble, and lost more freinds for the company, than any other salesman they have, albeit his record shows a higher number and volume of sales than his rivals. He has a habit of forcing sales, of ramming the goods down the throat of the customer, so to speak. His chief asset in selling—if it may be called an asset—is 'brass.' He has a large nerve. Nothing phases him. He will ride roughshod over most of the objections advanced by a woman (most of his sales are, of course, to this sex), and he manages, somehow to get away with a down payment. But his percentages of 'returns,' the number of adjustments which must be made with his sales are out of all proportion to the actual volume of business. On the other hand, I know of a man in the same company who is away at the bottom as a salesman, but who stands so well with his customers that a great percentage of his business comes in to him—and people are continually calling him up, or coming into see him, to give him prospects or to re-order other goods. He is not brilliant; he is a plodder, but he has tact, and courtesy plus good breeding. People like to do business with him. He represents to his customers one phase of 'store atmosphere' while salesman number one represents another.

Making Friends for the Store.

"I would strongly urge commercial managers and executives supervising sales forces to watch this question. They will find that there are tremendous 'peaks' and 'valleys' in the sales curve of the usual 'brilliant' salesman. He is frequently the 'put-it-over-on-the-customer-type' as a man expressed it to me. He will not last as long as the less brilliant man, but the chap who buckles steadily into his job. And he drifts—he has to be continually prodded up. He doesn't usually care for anything but himself, and winning a prize or breaking a record, after which he may be content to relax and let things slide. Such salesmen do not create store atmosphere. They may be a decided deterrent to its development. Of course, I would not imply that all men who top the sales lists are unstable, or inclined that way. I would suggest a very careful analysis of the sales records, not alone from the money consideration, but from the attitude of how many friends have they made for the company? How do they contribute toward building store prestige, store reputation In short, does the store and its policies come first with them, or their own immediate gain?

Little Things That Mean Much.

"Indeed we have; we have a splendid line of irons," replied a salesman to a little old lady who was inquiring if they had such goods. Not alone the ten words, but the way he said them, made you warm to him at once. He was plainly "sold" on his own goods. He believes in the merchandise they had, and as he directed his customer toward a table display it immediately flashed through my mind how few salesmen really put into their opening remarks the enthusiasm and interest shown by this chap. You can see a lot radiating from those few words, and the way they were said; enthusiasm in the store, and the merchandise; confidence in their ability to please the customer, and an assurance—just enough of it—indicated to make the customer feel that she was going to find just what she wanted.

"He's not particularly brilliant," said his manager to me a little later, "but he is enthusiastic and that's what makes a hit with me. He actually believes—and he is able to get his belief across to his customers. Why, it would be like clapping his wife in the face, to discredit the quality or value of any of that merchandise"—he smiled, "and when you get a man like that, and can train him in the details of selling, you've got a winner."

Dislike Asking For Money.

Many salesmen, particularly those who work on the floor, in the store, dislike asking for money. It is difficult to screw their courage to the point where they must say, "that will amount to $5.75, thank you." And frequently sales are lost through this failing. Most large stores are careful to coach salespeople on this point. And in the selling of specialties, especially where there is to be a down payment, and the balance on time, it pays to give careful thought to the best ways to secure the customer's money without embarrassment, or loss of the sale.

Usually the direct request is not as good as if you will merely say, when the purchase is completed. "That will amount to $5.75." Such a suggestion usually brings the money without any direct question being made. In a time payment sale it is always advisable to go carefully into the details of the time and amount of payments at the very outset. Salesmen must be coached not to fear this so much as they should fear the sale being lost later through a confusion over the matter of terms, or payments.

Masco Company in Larger Quarters

The Masco Company, Ltd., whose offices have been for many years at 91-93 Queen Street East, Toronto, are now moving one street south, and will be located after Sept. 1st, at 76 and 78 Richmond St. East. These premises are on the north side of Richmond Street, just east of Church Street, and immediately south of their old location. The new quarters comprise a modern four storey warehouse building with a frontage of forty feet on Richmond Street by a depth of ninety feet. Two of these floors will be occupied immediately by the Masco Co. and are being fitted up to give the best possible electrical wholesale service. Mr. C. A. McLean, the manager of the Masco Company, can be depended upon to give his electrical friends a cordial welcome when they come to inspect his new premises and stocks of electrical merchandise.

Father of "Open Price" is Dead

A. J. Eddy of Chicago, author of the book "New Competition," which was the beginning of the Open Price Plan of exchanging and comparing tenders, died on July 21st. This Open Price plan has attracted much attention not only in the electrical field, but also in general contracting and in many of the other sub-grades. It has been in operation among Toronto electrical contractors for about two years, and in a modified form in Vancouver for about the same time. At other points in the Province of Ontario the Open Price plan is in operation among other classes of contractors. Wherever it has been used the result has been a gradual improvement n the status of the contractor and of his methods of doing business.

Goodwin Coming Again

Preliminary suggestions are being made in Montreal for a return visit of Mr. W. L. Goodwin to that city. A small committee is working on the details.

Window Propaganda of English Electrical Contractor Dealer

A Little Conservative Perhaps but, as Usual, He Gets There

A few commendable efforts of English electrical contractor-dealers in the way of window display propaganda, are given below. They may be of interest to Canadians as representing the observations of a recent visitor to the old land, who sends them in. Our correspondent complains that the inherent conservatism of the Englishman is opposing unnecessary obstacles to the more general use of electricity, but finds that the contractor-dealer is working hard to overcome this prejudice.

Time For Tea.

Heath, Wingfield & Co., Knightsbridge, London, had a daintily set tea tray in the middle of their small show window, accompanied by the following card:

> "Step Inside. Four O'clock Tea Supplied in Five Minutes by the Electrical Process."

"DEMONSTRATION FREE."

Devoting Trims to Cooking Appliances.

The Bromley Electric Light Co., Bromley, Kent, are handicapped by small, narrow windows, far above the sidewalk. One must climb a fight of stairs in order to gain admittance to the inside of their showrooms, yet this did not prevent them making full use of the limited facilities at their disposal.

In their first window an electric hot plate was displayed on a pedestal at each end, with a sign hung from a chair in the middle. The sign stated that—

> "The Electric Hot Plate will boil a kettle of water. Toast, fry and perform all the duties of a gas ring. No flame, no danger."

The second show window was devoted to an electrical kettle, while a suspended sign pointed out—

> "Electric Kettle—Two pints of water can be boiled in an electric kettle in ten minutes at a cost of one-sixth of a penny. Notice the absence of fumes and smell and the perfect cleanliness."

The Iron Argument Via Poster.

The Borough of Stepney, London, put out a very attractive poster while the weather was warm. I cannot recall now whether there was a lithographed sketch of a witch mounted on an electric iron instead of the conventional broom, or not. I can, however, quote the wording of the poster correctly:

> "Electric Ironing means good work. A 'witchon' an iron."

Increasing Current Consumers.

To obtain more electric light consumers, the Croydon Lighting Corpn, Croydon, Surrey, made extensive use of the local newspapers as well as the street cars. One of their newspaper announcements enquired:

> "Do You Require a House That Will Give You the Minimum Amount of Work and Always Keep Clean and Healthy then
>
> USE THE ELECTRIC SUPPLY FOR HEATING, LIGHTING AND COOKING."

Their street car sign patted the prospective consumer on the back, and who is there who does not fall for compliments such as the one below—

> "Of course, you use electric light
> It's so cheap in Croydon."

"Atmosphere' That Counted.

Hazelton and Blythe, Paddington, London, floored their show window with black and white checked linoleum to suggest the kitchen "atmosphere." The display contained a few electrical cooking appliances, each article being laid over a dainty embroidered gold mat.

For the Autumn.

Oborn, Paddington, London, had a display of electrical household appliances last autumn. Seasonable surroundings for the same were provided by sprays of golden and red autumn leaves hung down the rear of the trim. Loose autumn leaves were scattered over the floor among the articles displayed.

Two Good Investments.

John Russell & Co., Charing Cross Road, London, announced by the card route in their electrical show window that—

> "Victory Bonds and our Electrical Appliances are two sound investments."

Vases as Table Lamps.

W. Banham, Paddington, exhibited several vases that had been converted into electric lamps for the table. A card suggested—

> "Make Use of Your Vases. Convert them into lamps."

The Silent Salesman Window.

The Ajaz Co., Ilford, Essex, permitted their illuminated windows to act as their silent salesmen, for in one of them appeared the following card:

> "The Shop is Lit by Half Watt Lamps.
> Note the Effect."

Our correspondent adds: "Only by the employment of aggressive salesmanship and advertising methods that take into account British psychology, can the English electrical contractor-dealer hope to make converts to the good cause—electricity."

The Cost of Good Lighting vs. The Cost of Bad Lighting

A Proper Lighting System, to Install and Maintain, Costs Only 1.4% of the Cost of Labor in a Large Factory

The National Mazda Lamp Company has gathered a quantity of data on the cost of good lighting relative to the cost of labor in general, and reaches the conclusion that good lighting only costs 1.41% of what labor costs. These figures are arrived at following investigations in a plant employing 100 men, which is lighted by one hundred 200-watt tungsten lamps. The initial cost of the lighting installation was computed, and from this figure the fixed charges of interest and depreciation, plus maintenance and energy charges were computed and added to make up the total operating cost. The wages of 100 workmen for 50 weeks were then compared with this figure, and it was found as noted above that the lighting cost was only 1.41% of the cost of the labor.

The report does not state what percentage the cost of labor was of the total cost of manufacture, but presuming it to be 60%, this works out that the cost of lighting is less than one per cent. of the total cost of manufacture. This is probably much less than the average manufacturer considers his lighting cost to be.

On the score of the savings that might be effected good lighting in a factory, these figures show that a very small amount of lost time on the part of employees may easily offset the cost of good lighting system. Any employee wasting 1.4% of his time by delays in locating articles, turning out an imperfect product, or by lost motion and energy in a dozen and one ways, would lose more than the cost to install proper lighting—and 1.4% of an eight hour day is only approximately seven minutes. How many factories are there where the employee does not lose more than two or three times as many minutes as this in lost motion of some kind during the day. Here is a splendid argument for the illuminating engineer and the salesman of illuminating equipment, which is unanswerable on the score of economy.

These figures appear to be very conservative, as the operating expenses were figured fairly high; for instance, a six cent rate for energy was allowed, while the wages were placed at $25 a week. The following table indicates how the ratio was arrived at. It may well serve as a guide for compiling a similar ratio where operating conditions in a plant are different.

COST OF LIGHTING TYPICAL PLANT

Initial Cost of Installation:		
100 outlets at $10 per outlet, including labor, conduit etc.		$1,000 00
100 reflectors and holders		281.16
100 200-watt Tungsten lamps		190.90
Total installation cost		$1,472.06
Annual Operating Cost:		
Fixed Charges:		
Interest and depreciation at 10%	$147.21	
Depreciation on wiring at 10%	100.00	
Depreciation on reflector equipment at 10%	35.15	
Total		$ 282.36
Maintenance Charges:		
Lamp renewals	$190 90	
Cleaning of units at $1.00 each per year	100.00	
Total		$ 290 90
Energy Charge (1,000 Hours):		
Energy at $0.06 per kw.-hr.		$1,200.00
Total annual operating cost		$1,773.26
Cost of Labor:		
100 men for fifty weeks at $25 per week		$125,000.00

The ratio of the annual payroll lighting cost to the pay roll is the ratio of $1,773.26 to $125,000.00, or 1.41%.

Operation and Care of Vehicle-Type Batteries

A most interesting booklet has been published by the Bureau of Standards at Washington dealing with the operation and care of vehicle-type batteries. It is elementary enough to be useful to the beginner, and technical enough to supply all the necessary information. The subject matter, which is verp complete, may be judged from the following heads: 1, introduction; 2, lead-acid type batteries; 3, nickel-iron type batteries; 4, reactions; 5, capacity; 6, voltage; 7, resistance of the battery and its relation to the external circuit; 8, sulphation of lead batteries; 9, electrolyte; 10, testing; 11, charging; 12, receiving a new battery; 13, dismantling and assembly of lead-acid type; 14, cleaning (lead-acid type only); 15, storage.

George Cutter Works Doubling Capacity

The George Cutter Works of the Westinghouse Electric & Manufacturing Company, South Bend, Ind., is making extensions which will double its manufacturing capacity. These extensions include a new foundry space of 64 feet x 112 feet, and a second floor measuring 66 feet x 250 feet, for assembling and storage rooms. In addition, outdoor storage space has been obtained which will increase the facilities greatly.

"Shopping for Service" in Electrical Stores

Plans Adopted by Other Retailers to Improve Their Selling Methods Applicable to Contractor-Dealer

As an additional means for helping to make the advertising of retail stores more effective, by insuring that salespeople will understand the policies of the stores employing them and will render a service in keeping with the claims of the advertisements, the Better Business Commission (vigilance committee) of the Cleveland Advertising Club has inaugurated a system of "shopping for service" for the benefit of the stores. These shoppers operate under the immediate direction of the manager of the merchandise section of the Cleveland Commission, and their reports upon the treatment they receive in the stores is passed along, confidentially, to the manager of the store involved.

A moment's reflection reminds us that in many lines the service which the salesperson should render is almost as important as the merchandise in determining whether the customer will be well enough satisfied to desire to come back again, and many store managers believe that shopping their own stores is more important than shopping the stores of competitors.

Before the service was offered, an extensive investigation was made of the things which the shoppers should ascertain, and, as a result, an instruction sheet was prepared, which should be of interest to our readers. This sheet is as follows:

Did the Merchandise Compare Favorably With the Advertisement?

About what time did you enter the department?

Did you find everything the advertisement offered?

If not, what was lacking?

In your opinion did the advertisement over-rate merchandise?

If not, was merchandise even better than you expected?

If comparative prices were quoted do you think the advertised value was reasonable as compared to values quoted in other stores for the same class of merchandise?

Was there, in your opinion, any misstatement of fact in the advertisement that has not been brought out in the answers above?

What?

Why?

Department

What was its condition?

Did it attract you?

What were salespeople doing?

Did you notice anyone waiting for attention?

Remarks:

Sales Clerk.

Did you have to wait for attention?

Sales clerk's name, number or description?

Greeting.

Appearance.

Did you assume a reason for going into the department that could easily have been a reason any customer might have? If so, what?

Did the salesperson appear interested and want to help you with this problem?

Did salesperson make any suggestion?

Did salesperson have any good talking points?

Did salesperson offer any substitutes?

How much stock was shown?

Was salesperson acquainted with stock?

Was salesperson acquainted with advertisement?

Was interest in you shown until the end?

Were you invited to call again by the sales clerk?

Did sales clerk give any other information than prices
If so, what?

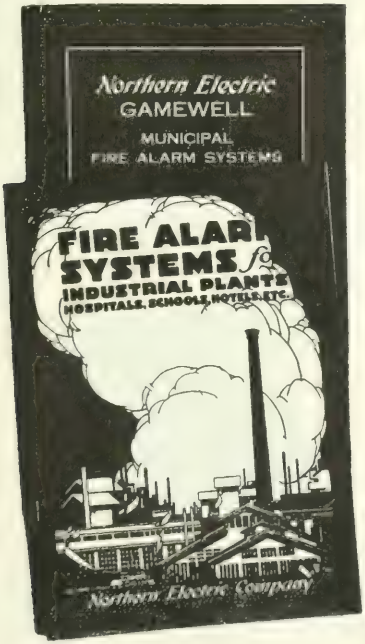
Were you shown any courtesies by anyone in the store beside the sales clerk?

Remarks:

The service which the Cleveland commission is thus rendering, is in keeping with the idea of helping business men to make their advertising effective in the greatest possible degree. It is not enough that advertisements be true and attractive. A store must render a proper service to back up the advertising, and this service is designed to encourage good sales methods and to call attention to common omissions.

New Fire Alarm Publications

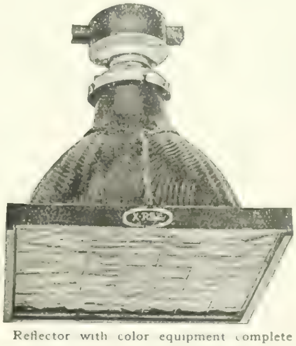
The Northern Electric Company has just issued two new fire alarm bulletins. One of these describes fire alarm systems for municipalities; the other fire alarm systems for industrial plants, schools, hospitals, hotels and public buildings. The intricate and important problems connected with fire protection are treated in detail with descriptions and illustrations of the various systems and equipment used. The books also contain some very vital statistics on fire losses and an outline of the history of fire alarm development. They are excellently printed on first-class stock and cover designs are in appropriate scarlet; appearance and contents combining to make a most impressive exposition of an important subject. Sample copies of both publications were distributed to the Fire Chiefs at the International Fire Chiefs' convention, just held at Toronto, and met with very favorable comment.



What is New in Electrical Equipment

Window trimmers and illuminating experts have, of late, been experimenting to find some practical means of producing colored lighting effects in display windows. Many different schemes have been used to produce the desired color effects. In some cases gelatin has been applied, which has been harnessed to the reflector by various methods. Incandescent lamps have been superficially colored with various kinds of "lamp dip." The use of natural colored glass lamps of the Mazda "C" type has also been tried, but the colors fade out rapidly, and it is difficult to gain the desired effects and make them permanent. In some cases a sheet of colored glass has been suspended below the reflector.

The Engineering Department of the National X-Ray Reflector Company (who are manufacturers of the standard X-Ray one-piece silver-mirrored window reflector, and who devote a large part of their research work to the proper lighting of show windows) has recently developed a means of producing colored light in show windows which, they claim, has solved the problem of color effects. The device which they present will be called by the trade name "Color-Ray," and consists of a metal frame which fits over the mouth of the X-Ray Jove and Jupiter reflectors. This frame supports a slide of colored gelatin which is held in place by fine steel meshes. The slide slips in the frame and, therefore, the color can be changed readily. When the ordinary white light is desired the slides may be left out altogether while the frame which supports them may be left on the reflector, it being very inconspicuous and in no way interfering with the amount of light that is produced. The frame is fastened to the reflector by means of an asbestos cord harness designed so that it may be attached without disturbing either the reflector or the lamp.



Reflector with color equipment complete

Colored gelatin is the only medium that has been found that will not fade rapidly under the heat of the Mazda "C" lamp. The color-frame which holds the gelatin screen is so designed that there is ample ventilation for the complete unit. Another important consideration is that the gelatin used is non-inflamable. Standard colors are used which have been selected by a committee of lamp and lighting men.

To the window trimmer or to the merchant who is in-

[illegible] display window advertising, the value of this innovation will be seen at once. There is nothing that will attract the attention of the prospective purchaser to a window display so quickly as will light of the proper color upon the merchandise displayed. By the use of the various colored slides, which are supplied by the manufacturers, almost any combinaion of colors can be secured. In some of the trial installations where a high intensity of light was desired, two rows of reflectors extending across the whole window were used which allowed the color combinations to be made the most of.

The uses to which colored light in windows can be put are infinite. Their extent depends only upon the ability and imagination of the window trimmer. For instance at Christmas when the dominant tones in the window are brilliant red, bright gold and silver tinsel, a brilliant red light upon the picture will enhance its attractiveness many-fold. Sunlight effects, the atmosphere of moonlight, marine blues or heavy purples can be obtained at the will of the artist who plans the display. In some instances the colors can be worked in connection with a flasher which will change the color combinations constantly. The attention drawing effect of this method can be readily seen by those whose profession it is to attract attention.

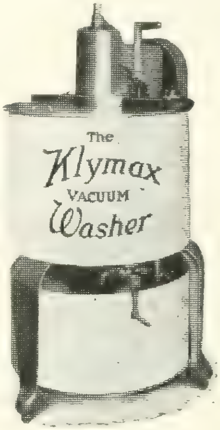
Easy to instal

The first public appearance of the "Color-Ray" unit was at the twenty-third annual convention of the International Association of Display Men which was held in Detroit from July 12th to the 15th. It will be on the market, in commercial quantities, shortly.

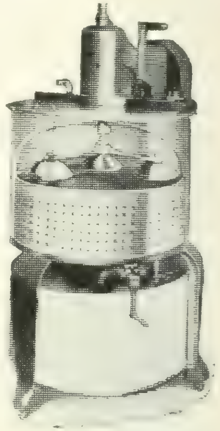
Boils Washes, Dries the Clothes

A washing machine which theoretically combines a large number of important features shown in other machines is being manufactured by the Slade Mfg. Co., Ltd., of Owen Sound, Ont. One of the objections to the average washing machine is that it is necessary to boil the clothes in a separate receptacle, but the Slade company take care of this item by the installation of a gas heater, with which every washing machine is fitted. Another feature, shown only in one other Canadian machine, is the centrifugal drier which takes the place of the ordinary wringer. This machine has the trade name of "Klymax," and it is claimed that it will wash everything from the most delicate fabric to heavy blankets and rugs without injury to the fabric or the buttons. An illustrated folder describes this machine, an exterior and phantom view of which is shown herewith.

The vacuum principle is used for washing the clothes in the "Klymax" machine. Following this operation the [illegible] is drained off into [illegible] below by the simple turn of a faucet. Fresh, clean water is next turned on the clothes to rinse them, and the rinsing water is run off into the drain. Following the rinsing, the whole tub of clothes is dried by centrifugal motion. It is claimed that in one minute it is wringer dry, and in fifteen minutes is ready for ironing. Following the removal of the first tubful of clothes, the soapy water is pumped back for use a second time. Any dirt or foreign substance which may have settled to the bottom while it was resting in the lower reservoir is left in the reservoir and later drained off. If the soapy water is now too cold for the second tubful, it is heated in a short time by the gas heater which, as noted above, is installed on all machines.

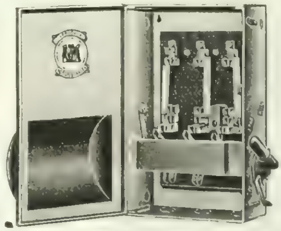


The Klymax


A Phantom View

A New Motor Starter

The Canadian Drill and Electric Box Company, Toronto, are placing a new motor starter on the market. It is claimed to be superior to the double throw type, in that it is foolproof and the blades are protected by a safety guard. The starter is small and compact, has a straight through motion, and must be tripped to turn it off. The fuse clips are dead when the switch is in the "off" position. In the illustration shown the safety guard may be seen protecting the blades.


A Safety guard protects the blades

Electricity as a street illuminant was introduced to Canada at the Canadian National Exhibition in 1882.

The first electric railway in America and the second in the world was operated at the Canadian National Exhibition in the early '80's.

Current News and Notes

Berwick, N. S.

The new electric light and power plant at Berwick was recently given its initial test. The plant is located at Factorydale, about five mileh south west of Berwick, and is reported to be one of the best equipped in that part of the country. The plant contains a 200 h.p. twin turbine direct connected to a 125 kv.a. alternating current generator.

Dauphin, Man.

Messrs. Ramsey's, Ltd., are building a two-storey departmental store in Dauphin, to cost $150,000. Messrs. Carter, Halls & Aldinger, Union Bank Bldg., Winnipeg, have been appointed general contractors, and are calling for prices on all sub-trades.

Gull Lake, Sask.

Contract for the electrical work on new branch of the Merchants Bank of Canada at Gull Lake has not yet been let.

Guelph, Ont.

The Guarantee Battery Corporation of Denver, Colorado, have decided to erect a Canadian plant at Guelph for the manufacture of all lines of batteries for power, independent and isolated lighting and automobile batteries. Approximately 55 per cent. of the raw materials will be purchased from local Guelph industries.

Galt, Ontario.

The Canadian Metal Products Company, Galt, is now manufacturing the Federal washing machine.

Hamilton, Ont.

Extensive alterations are being made by the Dominion Canners Ltd., to their building on Hughson St. Messrs. W. H. Yates Construction Co., 17 Main St. East, Hamilton, have been appointed general contractors, and will let contract for electrical work.

Messrs. Firth & Jones, Bank of Hamilton Bldg., Hamilton, Ont., have been awarded the contract for electrical work on $40,000 bank being built at Sanford and King strets.

Hull, Que.

Contract will be let for electrical work on $250,000 technical school being built at Hull, Que., by the Technical School Commission. Architecth, Messrs. Brodeur & Pilon, Hotel de Ville St., Hull.

Kitchener, Ont.

The Dominion Tire Co., 140 Strange street, Kitchener, will let contract for electrical work on $85,000 sub-station which they are building in Kitchener, Ont.

Kenora, Ont.

A by-law to sell the municipal hydro electric plant to Mr. E. W. Backus of the Keewatin Lumber Co., Ltd., was carried by a large majority.

London, Ont.

Contract for electrical work on shoe store being built by Mr. J. Agnew, 226 Dundas street, London, not yet let.

It is being planned by the Grand Trunk Railway to operate all switch lights and yard lamps—several hundred in number—by electricity. By this plan it is hoped to considerably reduce the cost of operation. In connection with the new system, several safety devices will be worked out, among them being one for lightning proof, so that wrecks cannot occur during heavy thunderstorms by signal lights going out.

Mr. E. V. Buchanan, general manager, Hydro-Electric System, Hydro Bldg., London, would like prices on an electrically driven pump, capacity 500,000 gallons daily.

Montreal, Que.

Mr. G. C. Mason, 404 Beaudry Street, Montreal, will let contract for electrical work on four residences which he is building on Regent Ave., Montreal.

Mr. A. G. Noseworthy, Architect, 304 University Street, Montreal, will shortly call for tenders for electrical installation amounting to over $3,000 on new moing picture studio being built by Canadian Films Ltd.

Messrs. Vincent & Say, 351 Union St., Montreal, have been awarded the contract for the electrical work on $90,000 residence being built at 317 Drummond Street, by Mr. A. A. Hodeson.

Messrs. Brady, Normandeau & Deary, 115 Bienville St., Montreal, have been awarded the contract for electrical work on the St. Henri Methodist Church hall being built at St. Antoine & Convent Sts., Montreal.

Contract for electrical work on $70,000 warehouse being erected on St. Paul St. W., by Messrs. LaPorte Martin Ltd., has not yet been let. Architect Jos. Sawyer, 407 Gut Street Montreal.

Contract will be let for electrical work on St. Michel Roman Catholic School, Montreal. Architects, Vautrin & Bernier, 92 Notre Dame St. E., Montreal.

Contract will be let for electrical work on $90,000 Roman Catholic church and school being built at Crystal Park. Architect, Mr. J. H. Caron, 284 Beaver Hall Hill, Montreal, Que.

Messrs. J. A. Francoeur & Co., 538 Fabre Street, Montreal, have been awarded contract for electrical work on factory being built on Panet Street by Mr. A. Raymond.

In connection with the $400,000 school being built by the Protestant Board of School Commissioners, Messrs. Philip Lahee & Co., 3 St. Nicholas St., have been awarded the contract for electric wiring, and the Montreal Electric Co., Ltd., 94 St. Felix St., the contract for installation of electric call system.

Contract will be let for electrical work on forty-two residences to be built on Cote Des Neigs Road by the Senneuville Development Co.

In our issue of August 15th, the name of the firm securing the contract for the electrical alterations to the Windsor Hotel, Montreal, was given as Canadian Electrical Co. This should have read the Canadian Comstock Company.

Moncton, N. B.

A vulcanizing plant, estimated to cost $25,000, will be constructed on Mechanic St., Moncton, by Mr. W. W. Lodge, 600 Main street. Contract for electrical work not yet let.

Messrs. Perry Bros., 773 Main street, have been awarded the contract for electrical work on the addition being built to the Farmers Co-operative Creamery building.

Montague, P. E. I.

Contract will be let for electrical work on $20,000 branch of Canadian Bank of Commerce being built at Montague, P. E. I. Architects, Dominion Realty Co., 23 King St. W., Toronto, Ont.

Moose Jaw, Sask.

[illegible] $200,000 [illegible] office building at Moose Jaw, Sask. Contract for electrical [illegible] General Supt., A. A. Mather, C. P. R., [illegible]

Ottawa, Ont.

Contract will be let for electrical work on $350,000 theatre being built on Sparks Street, Ottawa, by the Famous Players Canadian Corporation. Architect, Mr. Thos. W. Lamb, 269 Victoria St., Toronto, Ont.

The Marchand Electric Co., National Bank Bldg., Ottawa, have been awarded the contract for electrical work on $20,000 laundry being built on Waller St. by the University [illegible]

Mr. Stanley Lewis, Metcalfe Street, Ottawa, has been awarded the contract for electrical work on $50,000 residence being erected by Mr. A. L. Florence, Botilier Street, Ottawa.

Owen Sound, Ont.

Contract will be let for electrical work on theatre being built at Owen Sound, Ont., by Messrs. Chris. Georgas & Peter Leos. Architects, Hall & Duerr, Lumsden Bldg., Toronto.

Point Grey, B. C.

Plans are being prepared for the erection of an $85,000 school at Kerrisdale by the Point Grey School Board. Contract for electrical work not yet let. Architects, Twizell, Birds & Twizell, 719 Metropolitan Bldg., Vancouver, B. C.

Port Bruce, Ont.

Mr. Clark Johnson is building a two-storey general store at Port Bruce, Ont., and would like prices for electrical work.

Regina, Sask.

Messrs. Carter, Halls, Aldinger, Union Bank Bldg., Winnipeg, have been appointed general contractors for $250,000 branch of the Merchants Bank of Canada beng built at Regina. They ask prices for electrical work.

St. Boniface, Man.

Contract for electrical work on boiler house to be let. Dynamo and three phase motor required. Owner, North Star Oil & Refinery Co., Bank of Ottawa Bldg., Winnipeg.

The Standard Packing Co., McIntyre Block, Winnipeg, are erecting a cold storage plant at St. Boniface, Man. Contract will be let for electrical work.

St. Catharines, Ont.

The Clifford Electric Co., Ontario St., St. Catharines, have been awarded the contract for the electrical work on Macaroni Factory being built at St. Catharines by the Dominion Canners Co. Ltd., of Hamilton, Ont.

Tenders for electrical work will be received by Mr. Bryant Fleming, Wyoming, New York, for $40,000 residence being built at 8 Glen Ridge Ave., St. Catharines, Ont.

Toronto, Ont.

Messrs. H. F. Richie & Co. Ltd., 10 McCaul St., are constructing a $15,000 addition to offices at 16 McCaul St. Contract for electrical work not yet let. Architect, C. M. Willmot, 100 Stibbard Ave., Toronto.

Mr. J. W. Shingler, 2443 Dundas West, has been awarded the contract for electrical work on $80,000 addition being built at 2480 Dundas West by Messrs. Lownes, McCain Mfg. Co.

Contract for electrical work on six semi-detached residences on Daulac Ave., not yet let. Owner, G. C. Mason, 54 Iona Ave.

Messrs. Bennett & Wright Co., 72 Queen East, Toronto, havebeen awarded the contract for electrical work on the new Art Building being erected at Grange Grounds by the Ontario College of Art.

Contract will be let for electrical work on $15,000 residence and garage being built at Hilburn and Connaught Avenues by Mr. E. E. Ryerson, 86 Adelaide East.

The Canada Electric Co., 175 King St. East, have been awarded the contract for the electrical work on a five-storey factory being erected at Queen & Davies Streets by the Coleman Lamp Co., Wichita, Kansas.

The contract for electrical work on office building being erected at Victoria & Dundas Streets by Mr. Percy Hermant is not yet let. Architect, Benjamin Brown, 313 Manning Chambers.

Alterations to the extent of $25,000 are being made on the Hotel Arlington, John & King streeth. Contract for electrical work not yet let.

The Salisbury Electric Co., 615 Yonge Street, have been awarded the contract for electrical work on $25,000 addition to warehouse being built at 33 Mutual Street, by the L. R. Steel Co., Ltd., Royal Bank Bldg., Toronto.

Contract will be let for electrcal work on $70,000 Press building being erected on University Crescent by the University of Toronto. Architects, Messrs. Darling & Pearson, 2 Leader Lane, Toronto.

The Canadian General Electric Company have taken out a permit for the erection of a brick factory at Wallace and Ward Avenues, to cost $400,000.

The main cylinder of the steamer Chippewa recently developed a crack which was repaired in a short time by the portable welding outfit of the Lincoln Electric Company.

Contract for electrical work on the addition to store at 24 Queen West not yet let by the T. Eaton Co., Ltd.

Electrical workers, machinists, blacksmiths and carpenters employed by the Toronto Railway Company and Toronto Power Company have been given an increase in wages by the Conciliation Board award amounting to approximately ten cents per hour on the average.

Teulon, Man.

Excavating has begun on a $20,000 branch of the Dominion Bank. Contract for electrical work not yet let. W. S. Darling, Western Supt., Dominion Bank, Winnipeg.

Contract for electrical work on $15,000 grain elevator will be let by the Western Canada Flour Mills, Teulon, Man.

Vancouver, B. C.

Mr. J. C. Reston, 314 Bank of Nova Scotia Bldg., Vancouver, has been awarded the contract for the electrical work on the new High School at 45th Ave. and Wilson Road, South Vancouver, B. C.

The Aviation Department of the Dominion Government have completed preparations for the construction of a $10,000 naval air station at Jerico Beach, Point Grey, Vancouver, B.C., comprising offices, garage, and various other units. Contract for electrical work to be let. Architects, Public Works Dept., Ottawa.

Victoria, B. C.

The Carter Electric Co., 615 View Street, Victoria, have been awarded the contract for the electrical work on the addition to the Auto School at Douglas & Broughton Streets, Victoria, B. C.

Virden, Man.

The town of Virden, Man., acting in conjunction with the Manitoba Power Commission, is building a new power house to generate and supply electrical energy to the citizens. The building will house two 120 h.p., semi-diesel oil engines, which will drive two kw. generators, 2,300 volts. It is planned to make this plant the nucleus of a much larger one to supply the whole Virden district.

West Summerland, B. C.

The Canadian Bank of Commerce are building a branch bank at West Summerland, B. C., at an estimated cost of $10,000. Contract for electrical work not yet let. Architect, Wm. F. Gardiner, 701 Vancouver Bldg., Vancouver, B. C

Winnipeg, Man.

Tenders will be called for electrical work on additions [illegible] Ave., Winnipeg. [illegible]

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MacLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

PUBLISHING HOUSE HUGH C. MACLEAN LIMITED

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 296 Broadway
CHICAGO - - Room 803, 63 E. Adams St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS
Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS
The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.
Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.
Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, September 15, 1920 No. 18

Splendid Electrical Exhibit at Canadian National

The Canadian National Exhibition, for the first time in its history, this year officially recognized the electrical industry by allotting them a separate building in which to make their displays, and it can be said without hesitation that the exhibit was a very fine one. It has been demonstrated that the "Electrical Building" idea is right, and that a much larger space could have been disposed of and no doubt this is now a fixed feature of the Fair. It must be a great satisfaction to anyone who has watched the growth of the industry through the few short years of its life to see a whole building devoted to electrical equipment and appliances. This is only a beginning, however. Next year the demand should be for a much larger building. At one of the director's luncheons mention was made of the new building requirements and the probability that more accommodation must be supplied before next year's Fair. The biggest and most prominently placed of these should be set aside for the Electrical Industry.

There is nothing to gain by shutting our eyes to the fact that the arrangements this year were not all that could be desired. To begin with, there was very little publicity given to the Electrical Building. The location also was a little off the beaten path. The one real feature that had been assigned—the electric sign—turned out to be an insignificant display that any suburban "movie" would have discarded as inadequate—and the lighting of the building was about comparable with the cattle stables. The excuse may be offered that this was the first time that there was no precedent to go by, but surely that could not account for so many of the omissions. It was even said the service to the building consisted only of three number fours (the type of service supplied to many a private home) to carry light and power for the operation of the equipment of some thirty-five electric exhibits. This meant that it was impossible to operate much of the equipment on display.

These little items are all easily remedied, however. Wherever the Electrical Building may be next year it should be surmounted by a sign that will discount anything else of the same kind on the grounds. The lighting should be the most modern and ample and the supply of power must be sufficient. One suggestion more: there should be some one man or group of men who are held responsible for the equipment of the building and who can be located by any exhibitor who desires information or assistance. This year nobody seemed to have any authority, or to know of anybody who had. The electrical men would do well, we think, to make an early choice of a committee or individual who will see to it that the second year of the Electrical Exhibit is a considerable improvement on the first.

Instantaneous Water Heaters Must Have Heavy Supply of Current

Instantaneous water heaters have been much in the public eye recently, partly as a result of a wide publicity campaign of a stock selling organization in Toronto which claimed for its heater greater efficiencies than were obtainable in other types. It is now stated that these people have found it advisable to move, and their address is at present unknown. It is to be hoped that they did not dispose of much of their stock, as it is quite unlikely it will ever have any monetary value.

At the risk of repetition we again point out the fundamental principle which governs all such equipment—that it is impossible to get any more heat out of electric energy than it contains. A kilowatt hour of electric energy contains 3412 British thermal units (B. t. u.) A B. t. u. is the amount of heat required to raise a pound of water one degree Fahrenheit. Now, as announced in the recent advertisement, this heater could be used from an ordinary lamp socket, which means that it could not consume more than 660 watts. The heating capacity of this device per hour was therefore the heating capacity of .66 kilowatt hours or 2252 B. t. u.

A gallon of water equals ten pounds. The temperature of the normal water is, say, 72 degrees. Therefore, water, to boil, has to be raised 140 degrees. Since one B. t. u. will raise one pound of water one degree Fahrenheit, it would require 1400 B. t. u. to raise one gallon of water 140 degrees. But this device supplies 2252 B. t. u. per hour. Therefore, it supplies enough heat to raise the temperature of 1.6 gallons of water to boiling point per hour. This works out at about one-fifth of a pint per minute, or less than one-half of the ordinary cup.

Germans Establish a Foreign Information Service for Export Trade

The electrical industry in Germany, as in the case of other industries in that country, is under the control of a separate foreign trade department in regard to the export trade. At the instance of the Foreign Trade Department for Electrical Engineering, a meeting was held recently at Berlin, when there were present representatives of the Chambers of Commerce, the authorities concerned, representatives of merchants and export organizations, and a number [illegible] manufacturers, have a special interest in the common and intelligent regulation of export questions and export prices. The object of the gathering was, by general discussion between all parties interested, to clear the air concerning the method of working and effects of the department and its control over foreign trade. Herr Brandt, manager of the department, stated that the department was established in order to adapt the trade to the changed conditions as soon as possible, and to aim at a simplification of the course of business. The reduction in the so-called social export tax of up to 10 per cent. of the invoice value, which had been asked for, had been sanctioned by the Special Committee of the Federal Board for Economic Affairs in the case of a number of electrical productions. As to the suggestions made in various quarters for the complete abolition of the control over foreign trade, the opinion of the Special Committee in question was that the time had not yet arrived for entire freedom, as stability in industry had not yet been established. The representatives of producers laid emphasis on the fact that the Council of the Central Syndicate of the Electrical Industry had again adopted a resolution in favor of the maintenance of the department in its present form. This decision was promoted by the consideration that the difference between inland and export prices should not again be allowed to be the cause of a "sale" or dumping through an impending reduction in prices. The representatives of the merchants were also in favor of the retention of control, although they urged a simplification of the regulations; and the workmen likewise supported the maintenance of the department. It was finally mentioned that the department had established a foreign information service which, with the support of makers and of exporters, would afford an opportunity for all interested parties to be informed of the situation and changes in the markets of the world.—Electrical Review.

British Electricity Commissioners Report Preliminary Survey

Some idea of the work of the British Electricity Commissioners who were appointed under the Electricity Supply Act of 1919, may now be judged from the first annual report of the Ministry of Transport which has been made public. Quoting from "The Electrician," we offer the following information:

Dealing with the work of the Electricity Commissioners, it is pointed out that a preliminary survey of the present and prospective electrical requirements of the greater part of the country has been made, and at the date of the report six districts will be determined very shortly. A number of applications for consent to establish now or to extend existing stations were received. The Commissioners found that in the majority of the applications a good case had been made out. Before giving formal or provisional consent, the Commissioners satisfied themselves that the need was urgent, that the proposals were technically sound and that there was no economical alternative source of supply at the moment or in the immediate future. Special reference is made to the applications of Manchester Corporation to construct a station at Barton having an initial capacity of 50,000 kw., with the possibility of ultimate extension to 150,000 kw.; of Leicester Corporation to construct a station of 10,000 kw., with the possibility of extension to 50,000 kw.; of Nottingham Corporation to construct a station of 40,000 kw., with the possibility of extension to 240,000 kw., and of the Derbyshire and Nottinghomshire Electric Power Company to construct at Colwick a station of 30,000 kw., with the possibility of extension to 120,000 kw. The Commissioners have sanctioned the applications of Manchester and Leicester Corporations, and an inquiry has been made into the others. Three other undertakers have applied for consent to the establishment of new generating stations, and the applications are still under consideration. In one case the proposed initial capacity is 66,000 kw., with the possibility of extension to 200,000 kw.; in another case it is 45,000 kw., and in the third case the capacity has not yet been decided upon.

With regard to extensions of existing generating stations, the policy of the Commissioners in dealing with the applications, which for the most part relate to plant only and not buildings, has been governed by the following considerations: (a) The necessity of facilitating the development of the electrical industry in any district; (b) the effect of any given extension upon the ultimate development of electricity supply in the district; and (c) the undesirability of extending a badly placed station in one district when a better situated station in an adjacent district could be extended and thus enabled to assist the first-named station.

The Commissioners have in a few cases had submitted to them proposals in regard to the establishment of new private generating stations. In accordance with the powers vested in them by sec. 11 of the Electricity (Supply) Act, 1919, the Commissioners have in certain cases prescribed regulation as to the type of current, frequency and pressure to be used with a view to the standardization of electricity supply in the districts concerned. The Commissioners have approved arrangements for mutual assistance being entered into between Bristol Corporation and the Keynsham Electric Light & Power Company, and between the Corporations of Nelson and Colne.

The Position of Electro-Culture—Difficult to Draw Definite Conclusions

A brief review of the status of "electric-culture" appears in a recent issue of "The Electrician." It is pointed out that interest in the subject appears to have subsided for the moment, and the reason offered is the difficulty of drawing definite conclusions from the result of the work.

The pioneer work of Lodge, Newman and Lemstrom showed us that some plant and vegetable growths at least responded so far to electric stimulation as to show a definite if slight increase in production when exposed to its influence. The difficulty arose, however, that in any particular field or with any particular crop there was no guarantee as to the effect electricification would have. That is, an electrified field might one year produce a crop distinctly above the average and the next year one as decidedly below the average, although as far as could be seen the conditions were the same

Electro-Culture and Potatoes.

This difficulty is very strikingly illustrated in some results obtained by Mr. S. E. Britton, city electrical engineer of Chester, which we published in The Electrician about two years ago. Experiments were made as to the effect of applying electro-culture to three varieties of potato. In the first year one crop showed an increase of 23.5 per cent., another an increase of 153 per cent., and a third a decrease of 7.5 per cent. In the second year all the crops showed a decrease. At this time there was a general interest in this question owing to the food shortage, but Mr. Britton quite rightly reported that though the system had great posisbilities its general application was unwarranted. The fact is that we do not know enough about the causes and the effect of the phenomena at work to make a definite pronouncement one way or the other as to the good or ill results likely to arise from the use of such methods of stimulation. Such varying factors as the class of crops, soil, manure, air conductivity, leakage, general meteorological conditions, effectiveness of discharge and other physical and chemical conditions come into play in a way we do not yet understand, but which we must learn to understand if anything is to be effected by this method of using electricity. It is obviously worth going into.

The Wolfryn Process.

The same contradictory results seem to be obtained when the electrification of seeds is considered. A report on this subject, recently made by Mr. Martin Sutton on some experiments undertaken by the Wolfryn process, indicate this clearly. The inquiry was designed to show whether the process was sufficiently beneficial to justify the expense, whether the process was equally satisfactory when electricity is not as when it is used as part of the immersion process. In these tests experiments were made first with the seeds placed in wet sand, carrot, swede, cabbage and mangold being used; and the results obtained were inconclusive. In the field tests with the same crops Mr. Sutton reports that the results were no more conclusive than were the tests for germination, the returns from the electrified seed showing no advantage over the other sections except to a small extent in the case of the mangold

Some French Experiments.

On the other hand, some experiments made by Heim in the Conservatoire des Arts et Metiers at Boulogne-sur-Seine on electro-culture by brush discharge gave distinctly better results. In these experiments a Gaiffe transformer was used, the working pressure being 20,000 volts. The negative pole, which consisted of an iron plate 1 in. square, was buried 1.5 m. in the soil, and suspended thin wires 0.5 mm. in diameter 2 m. above the soil about 0.8 m. apart from bell insulators of varnished glass were employed as the positive. It was found that with electrodes of such different sizes the current only flows in one direction without the use of rectifiers being necessary. The treatment was applied morning and evening for about two hours, though on hot days the morning treatment was omitted. All the plants were fairly advanced when the treatment began, and it was found that the tobacco plants electrified grew to a greater height than those not electrified ond flowered, while those not electrified did not flower at all. Cabbages, potatoes, sugar beetroot, all improved under the treatment. These are the most definite and encouraging results that have yet been obtained, and it would be interesting to know what effect the climate had on them and what the other conditions were.

Sale of Company Securities to Customers and Citizens

Extracts From Report Before the N. E. L. A. Pasadena Convention

Next to the financial aspect of the plan, the immediate effect upon the employees of the utilities is of the most importance, especially in the latest development of the plan where companies use their entire force to sell their securities to the public. Just as you can line up iron filings with the application of a magnet, so your employees seem to fall in with the purpose of the management as a result of this common endeavor. Things about their company that had always baffled them, the balance sheet, the boss' aloofness, the long nursed grudge, seem to straighten out. They begin to learn about their company's affairs. They find that gross income is not net profit (here we are speaking of the rank and file), that the boss is the same kind of man they are, and soon the grudge they nursed has suddenly spent itself for want of ammunition. This is conspicuously true or the line man or wire man who finds it unexpectedly easy to sell his company's securities and get a commensurate reward.

Through the medium of a big single purpose having as its object the welfare of all concerned with the company, comes a breaking down of department jealousies and a spirit of mutual confidence. We venture to say that democracy has first dawned in many companies with the advent of this plan. In short, all of the employees, from the officers down, get the company point of view and from that time are transformed from apathetic to useful representatives of the company.

And last among the immediate effects, but not least, the working out of the plan throws into relief many capable men before unrecognized. This point is important. New opportunities attract ambition and brains. Woe to the central stations when, through failure to keep their eye on the possibilities for the future, they allow their business to reach a point of stagnation. How many promising young men do we know who are planning to go into the steam railroad service

New Relationship with the Public

Beneficial as are the immediate direct results of the customer ownership plan, the indirect lasting results are still better. First of all, the customer ownership plan, of course, brings a new relation between the utility and the public it serves. After the utility has placed its securities broadcast among its customers it faces a fairer public opinion. People who heretofore did not care whether the company prospered or not, or perhaps would rather not see it prosper if their bills might thereby be lowered, once they have become stockholders in the company will become interested, whether consciously or unconsciously, in its welfare, and what is true of the individual is true of the community as a whole. Moreover the company in inviting large sections of the community to become owners in its business accepts a new responsibility for giving service. As a result of the corrective influence that a stockholder's standing carries, every individual connected with the company has a heightened sense of duty when coming in contact with the public. If the company has been the object of attack and suspicion it will find that a fuller appreciation of its problems will almost invariably result. In place of its knockers it will have its defenders. If it already enjoys the good-will of its public its position will be the more intrenched. This new order of things has been particularly valuable to companies which are not owned in their own locality.

Only a short time ago, for instance, the mayor of a town in northern Illinois had bought a share of stock in his home utility for his ten year old son and had said to him: "Now that you are a shareholder in the utility and a partner in the business, see to it that you take your part in looking after its welfare." A few days later the boy and his chum came upon a broken wire hanging in the street. "Now, stay here and keep people away and I'll go and call up the Public Service Company," said the little fellow to his chum, and so perhaps he succeeded in preventing a serious accident. The father was proud of his boy and the company was proud of its new stockholder.

Power Development at Raney's Falls

The Hydro-electric Power Commission has commenced work on the power development at Raney's Falls, near Campbellford known as dam No. 10 on the Trent Canal System. This dam, along with a number of others, was built some time ago by the Dominion Government as part of the Trent Canal system, at which time certain provision was made for power development. The development will consist of two 5000 h p. single-runner, vertical shaft turbines, operating under a 47 foot head. It is expected the plant will be in operation in 1922.

Record of Large Turbo-Generator Armature Breakdowns

The following statement is a complete record of armature breakdowns that have occurred in Westinghouse turbogenerators of 15,000-kv.a. or larger polyphase rating. The record covers every Westinghouse turbogenerator of this size that had been placed in operation up to January, 1920. These generators, without exception, are mica insulated, with mica insulation between strands and between conductors, as well as between coil and core.

The first Westinghouse generators larger than 10,000 kv.a. were placed in operation in 1913. These were generators, roughly 20,000 kv.a. in size, two-pole in the case of 25 cycles, and four-pole in the case of 60 cycles. The design of such large two and four-pole units in 1911 and 1912 was highly experimental, and while these units met the standard temperature rise guarantee of 50 deg. C. by the thermometer it has since been found that the true copper temperature of the strands nearest the air gap near the centre of the core have been at least 200 deg. C. rise in some cases. Experience has shown designers how to avoid these high local temperatures to a considerable degree (mainly by reduction of eddy-current losses), and this is mentioned here only to bring out the significance of the record of trouble due to heating.

During these seven years of experience there have been 22 cases of major armature trouble involving 12 different installations or designs and 16 individual units. By major armature trouble is meant trouble serious enough to result in the failure of one or more armature coils.

The classification of armature failures as to cause is in some cases a difficult matter. The events leading up to the trouble may be unknown and the evidence is very often burnt up. It has been thought best, therefore, to separate these cases into three classes as follows:

1. Where the manufacturer has accepted responsibility.
2. Where the operating company has accepted responsibility.
3. Where the cause is unknown or in dispute.

Assigning Causes of Failure

1. Eight cases were chargeable to design, workmanship or other causes for which the manufacturer accepted responsibility.

   (a) Five cases (of these eight) were caused by defects in manufacture that developed shortly after installation.

   (b) Three cases (of these eight) concerned details of design that led to failure after four or five years' operation. Two of these cases (in one design) involved high local temperatures caused by eddy currents in the top strands of the coil.

2. Eleven cases were chargeable to operating hazards for which the operating company accepted the responsibility.

   (a) Four cases (of these II) were caused by fire originating outside of the armature winding. In three of these cases the fire started in the cables just outside of the generator; in the fourth case the fire started in a series transformer accidentally open-circuited.

   (b) Four cases (of these II) occurred in one installation and were caused by abnormal voltage surges that caused the outside surface of the insulation to catch fire. In addition to these four cases that resulted in coil failures, as many more fires started that were put out before such damage was done. This trobule disappeared [illegible]

   (c) One case (of these II) was caused by [illegible] water carried into the generator from the air washer.

   (d) Two cases (of these II) were caused by enforced operation under conditions that were known to be unsafe. One case involved unsafe overloads and the other case involved continued operation after it was known that the armature needed minor repairs.

3. Three cases involved unknown causes or the cause was in dispute. In two of these cases the operating company believed armature-coil heating to be responsible.

This classification of armature breakdowns shows that out of 19 cases, where causes were agreed to, II cases were caused by operating hazards for which the generator can in no way be held responsible. The majority of these cases were caused by fires of external origin.

If all the cases in which armature heating was involved (even by suspicion) are grouped, there are only five cases out of 22 breakdowns. Two cases (involving one of the first designs) were caused by design proportions; in two others temperature was not the primary cause of breakdown, but the opening companies believed it to be a contributory cause, and in the fifth case enforced overloading was the primary cause.

Armature Heating Failures Caused by Abnormal Local Temperatures

The writer's opinion, based on a careful study of operating experience and based on a detailed knowledge of internal temperatures and coil and insulation design, is that breakdowns caused by armature heating are in reality due to abnormal local temperatures that have values of the order of several hundred degrees; and that temperatures of 100 deg. or 150 deg. C. ordinarily discussed in connection with guarantees have very little to do with the problem. This statement, of course, applies only to windings completely insulated with mica within the slots.

This record of breakdowns brings to the surface another fact that is interesting and important and that is reassuring to the companies operating high-voltage units. If these generators be classified according to voltage it is found there are twice as many generators wound for 11,000 volts or higher voltage as there are generators wound for lower voltages. But these 22 cases of armature breakdowns are equally divided between these two voltage classes. This means that the percentage of armature breakdowns in the high-voltage generators under discussion is only one-half that of the lower-voltage generators. This record would be very different with treated-cloth insulation (in large high-voltage generators) that is subject to cumulative heating on account of dielectric losses increasing with temperature, or with partially closed armature slots still used by some European designers.

High-Voltage Generators Probably More Reliable Than Low-Voltage

This record does not prove that high-voltage generators are necessarily safer or less subject to breakdown, except in so far as breakdowns may be caused by voltage surges that are independent of generator voltage. Obviously a 10,000-volt surge would be dangerous in a 2400-volt generator, but would be harmless in a 13,000-volt winding. The record does prove that 11,000 and 13,000-volt windings are just as reliable as low-voltage windings and that breakdowns are generally caused by trouble unrelated to line voltage.

The facts brought out by this record may be summarized as follows:

1. The majority of armature breakdowns are caused by operating hazards originating outside the generator.
2. Armature heating in armatures completely insulated with mica is a minor cause of breakdown.
3. High-voltage generators with mica insulation and open armature slots are as reliable and probably are more reliable than large low-voltage generators.

Electrical Display Held Prominent Place at Canadian National Exhibition

Special Building, Entirely Devoted to the Industry, Gives the General Public an Opportunity of Realizing the Universal Utility of Electrical Equipment

The individual electrical exhibits at the Canadian National this year were very fine indeed. Brief mention is made below of the most important displays. Most of these were in the Electrical Building, and it is to be hoped that next year will find them all there. Only in this way can the general public get an accurate viewpoint of the magnitude and importance of the electrical industry.

Canadian Independent Telephone Co.

"Efficiency, control, precision"—these words formed in one's mind as one viewed the exhibit of the Canadian Independent Telephone Co., in the Industrial Building of the Canadian National Exhibition, with its fine array of factory, office and apartment house switchboards, push-buttons, call-boards, automatic fire alarm systems, etc., with their beautifully burnished metal parts and finely stained woods. It requires a visit to such an exhibit to realize the great strides made in recent years towards perfecting these instruments and systems. Among the very latest devices put out by this company is one called the "Presto-Phone" or 2-in-1 system. The unique feature of this apparatus is that it combines the telephone and fire alarm systems in one. In the main it is a telephone system, but is so constructed as to embody a signal service, which, by the pressing of a button will put all the bells on the entire system into operation. Many other handly little devices in the way of telephone accessories were appropriately arranged around the stand in a way that would please the most enthusiastic disciple of business system.

Clemens Electrical Corporation.

Amid the buzz of machinery and flying belts in the Machinery Hall at the Canadian National Exhibition, the exhibit of the Clemens Electrical Corporation of Hamilton stood comparatively quiet and unassuming, yet attractive in its neat display of "J. C." electrical appliances. There was the "J. C." electric soldering iron, the "J. C." electric iron heater, the "J. C." fuses, and last, but certainly not least, the "J. C." electric toaster, the very latest thing out, according to Mr. R. C. Guest, who was in charge of the exhibit. It is sold in two designs, one being of plain wire construction, and the other of nickel plated sheet metal. In both styles the heating element is of the helical type, and replacable by removing two screws. These products are made at the Clemens factory in Hamilton, Ont., of Canadian material by Canadian labor.

The "Airplane" Washing Machine.

Many a housewife and prospective housewife stood watching the water "loop the loop," throwing up a white foam of soap suds inside the Airplane washing machine, and wondered as she had done many times that day if [illegible] the machine for her. The Brantford Washing Machine Co., of Brantford, Ont., who make the Airplane washer, are very proud of their machine, and take pains to point out that the Airplane washer boils while it washes the clothes, being equipped with a gas or oil burner under the copper bottomed tub. They also claim that by the peculiar motion of the tub the soapy water is passed right through the clothes approximately twice each second, and that friction is 100% absent, so that the most delicate fabric can be washed without danger of injury. But this is not all. The ringer of the machine can be easily removed and an ironing board—supplied with the machine—slipped into position, then, if during the process of washing and ironing, milady has become hungry, a large table top can be placed on the top of the washer, and, lo, you have a nicely fitted up table whereon to lay an appetizing little lunch for four people. "Isn't that cute," said one spectator, and most of those who saw it thought so too.

The "Blue Bird" Washer.

Many observers were constantly in evidence around the exhibit of the Blue Bird electric washing machine, listening attentively to the remarks of the lady demonstrator, as she carefully explained the many good qualities of the machine, which is one of the most attractive of its kind at the exhibition. The Blue Bird Corporation were not slow to realize the value of looks, and so planned and built a machine that would be an ornament to any home. They have also realized the importance of employing a woman demonstrator. It is a psychological fact that in buying a washing machine a woman prefers the opinion of one of her sex. For this reason the woman demonstrator seems to get closer to the prospective purchaser, for she understands better a woman's needs, and can explain the use of the article in the way best fitted to appeal to a woman's mind. At the Blue Bird exhibit, the demonstrator in charge, wherever possible, obtained the names and addresses of enquirers, and booklets, giving full particulars of the Blue Bird machine were mailed them.

J. H. Edmunds & Co.

The J. H. Edmunds & Co., 221 Richmond Street West, Toronto, had on exhibit an artistic display of electric fixtures at their stand in the Electrical Building, near the main entrance. The floor was carpeted, and in the centre stood a small table with a pretty reading lamp, throwing down a soft, even light. At each of the four corners of the room stood a floor lamp, each with a different colored shade, while from the ceiling hung numerous electrically lit fixtures, giving the exhibit a very brilliant and attractive appearance. Needless to say there were many enquiries, and every attention was given the public by the courteous sales staff in attendance.

Rogers Electric Co.

A large and attractive display of storage batteries, pocket batteries, transformers, condensers, detectors, telegraph outfits, fans, etc., were on exhibit at the stand of the Rogers Electric Co., on the east side of the Electrical Building. The various lines were carefully segregated and arranged in such a way as to avoid confusion, and enable the spectator to see everything. Although a little off the main aisle, it nevertheless had its share of patronage, which it well deserved. The Rogers Electric Co. are located at 145-147 Queen Street West, Toronto.

The "Time-Saver."

Among the many washing machines on exhibit in the Electrical Building, the "Time Saver," manufactured by Messrs. Beatty Bros., Ltd., of Fergus, Ont., had its own share of recognition. Its chief characteristics are compactness of construction and smooth, silent running. A competent, intelligent and courteous demonstrating staff were in attendance on the public, who kept them busy answering questions. Mr. E. A. Drury, 154 Oakwood Avenue, is the Toronto agent and was in charge of the booth.

The Renfrew Electric Co.

The Renfrew Electric Products Co., of Renfrew, Ont., occupied a commanding position at the main entrance to the Electrical Building at the Toronto Exhibition. Their stand was attractive, and their various lines carefully arranged. There were electric irons, heaters, toasters, percolators, thermos flasks, etc., but no attempt was made at overcrowding. Each line stood out separate and distinct from the other, so that nothing was missed. The Renfrew company are the manufacturers of the Majestic heater, the Canadian Beauty electric iron and the Canadian Beauty electric toaster. The sales staff were all that could be desired, courteous, attentive, capable.

Canadian Renulife Co.

"I cured about fifty headaches yesterday with that violet ray." So said the demonstrator in charge of the exhibit of the Canadian Renulife Electric Co., Ltd., Windsor, Ont., makers of the Renulife Violet Ray, and judging by the crowd pressing around the stand, it looked like there might be truth in the statement. The ladies were by far the greater per cent. of the ailing. A little hesitatingly at first, for the sight of those little fiery sparks of violet light looked somewhat disconcerting, but with encouragement from the demonstrator they soon were made quite at home. Little booklets were given to each one, describing what the violet ray could do for human health and happiness, with many printed testimonies from owners as to their efficacy. The Renulife company have had hundreds of inquiries, and are sufficiently [illegible] with orders to keep them busy for some time to come.

The "Eden" Washing Machine.

The Eden electric washing machine, or the washer with the sediment zone, was the centre of much interest. In the centre of the stand was a machine that had been in use for six years and had never required any repairs. This made a strong appeal to the women spectators. The main feature of the Eden machine is the sediment zone. As the dust and dirt is flushed out of the clothes, it falls through the perforations of the sanitary zinc washing cylinder into the sediment zone, where it is trapped in quiet water and cannot mix again with the clothes. The Eden driving mechanism is all enclosed, and is packed in solid lubricant, which does away with the necessity for oiling. If the washer or wringer becomes overloaded, an automatic clutch releases the motor and thus avoids burnt-out motors and fuses. The safety interlocking swinging wringer has five convenient locked positions. The attendants at the exhibit were courteous and painstaking in their efforts to answer all enquiries intelligently. This machine is sold by the Gillespie-Eden Corporation, 23 Scott Street, Toronto, Mr. Forbes Grassick, manager.

The Easy Washing Machine Co.

Great interest was shown in the "Easy" vacuum electric washing machine on exhibit in the Electrical Building by the Easy Washing Machine Co., Ltd., 4 Clinton Place, Toronto. This machine was awarded the silver medal at the Kitchen Exhibit at the Panama Pacific International Exposition at San Francisco. It operates on the vacuum or suction principle. When washer is in operation the two vacuum cups inside the tub move up and down sixty times per minute, taking a new position on each downward stroke. This suction carries away any foreign substance in the garments without injuring them. At extra cost, a gas heater can be installed under the tub to maintain the required temperature. The gears of the wringer attachment are all enclosed. The wringer is eleven inches across, and the best grade rubber rolls are used. The washer has a capacity of 10 sheets, or 14 lbs. of dry clothes. Protection against overloading is assured by automatic spring adjustment.

The Masco Exhibit.

The Masco Co., Ltd., 60 Church Street, Toronto, had an interesting exhibit of mill and mine supplies in the Electrical Building at the Canadian National Exhibition. Several show cases displayed Hubbell reflectors, for which the Masco Co. are agents, together with sockets, and other spare parts. The Masco Co. are also distributors for the Fyrac spark plugs made in Rockford, Ill. These plugs are made to fit any kind of engine for truck, motor car or tractor. The exhibit was well arranged, systematic, and reflected very creditably on the company. As announced in our last issue, the Masco Company have moved to 76-78 Richmond St. E., Toronto.

The Diamond State Fibre Co.

By the application of certain chemical processes to cotton rags the Diamond State Fibre Co. are producing—and have been for many years—Diamond Fibre, the present demand for which keeps eight factories in operation as well as numerous offices and warehouses in the principal industrial cities in the world. Those who saw the company's exhibit in the Manufacturers' Building will not soon forget the many interesting things they witnessed there. Owing to the multifarious number of products produced from Diamond Fibre we can give in this limited space but a brief outline of this interesting industry. Diamond Fibre, as a basic material, is produced in three primal forms—sheets, rods and tubes and, from them, is machined into various products, after being carefully graded. The two main grades are Hard Fibre and Flexible Fibre. The latter is made into gaskets, washers, and leather substitutes. The Hard Fibre is used extensively for electrical insulation, owing to its high dielectric strength and adaptability. It is hard and tough, without being brittle, and has undergone successfully the most severe tests under varying conditions. It is used extensively in Block Signal systems, and switch handles, lightning arrestors, conduits, bushings, switch bars, cleats, commutator rings, dynamo and generator parts, etc., are made from it.

The company publish a little booklet entitled "Diamond Fibre and Its Uses," which can be had on request, together with complete catalogues covering the Diamond Fibre products as related to the automobile, electrical, industrial, mechanical, transportation and textile industries. Mr. T. Elwood Webster, general manager, was in charge.

Moffat Stove Co.

The exhibit of the Moffat Stove Co., Ltd., included everything from little hot plates to large ranges for restaurants. The company gave out a very interesting booklet entitled "The Source of Cooking by Wire," which gave full and detailed information as to the construction and operation of their various electric cookers and stoves.

National Electric Heating Company.

An attractive booth in the Industrial Building was occupied by the National Electric Heating Co., showing the National Electric ranges, cooking appliances, electric irons, and electric heat rays. The company also showed circulation water heaters for kitchen tanks, various sizes. These heaters are now rapidly replacing gas heaters. Another feature of the National display was a 1700 watt heater with which they are fitting their ranges, thus doing away with any complaint that electricity is "slow." The booth was attractively arranged and well lighted.

Chas. A. Branston Co.

A great deal of interest was shown in the exhibit of the Chas. A. Branston Co., makers of the Violet Ray and high frequency generators, at the Industrial Building. Hundreds of men and women experimented with the machine, and the demonstrators were kept busy explaining the uses and benefits of the violet ray. On each side of the stand miniature moving picture apparatus kept the public informed as to the health-giving properties of the violet ray.

Prest-O-Lite.

The Prest-O-Lite Company had an exhibit of their well-known lines of oxy-acetylene cylinders in the Machinery Hall, as well as a complete outfit of welding and cutting appliances.

The Toronto Hydro-Electric System.

The exhibit of the Toronto Hydro-Electric System in the Industrial Building reflected originality and ability. It was pleasing to note the spirit of co-operation suggested by the number of different dealers represented. The exhibit was arranged in sections. One section was given over to vacuum cleaners, including the Eureka, the Hoover and the Premier. The centre of the booth was occupied by the Nineteen Hundred electric washer and the Kribs electric washer. At the back, running almost the entire length of the booth were several tiers of shelves on which were exhibited electric irons, percolators, toasters, fans, etc. Branston electric reverberators were also in evidence. A Hydro kitchen in operation was an interesting feature of the exhibit, demonstrations being given by lady attendants on cooking by electricity, and a table in the centre, set ready for use, showed how the different electrical appliances should be arranged and used. It was an education to those who had not seen an electrically-equipped kitchen before.

McDonald & Willson.

The exhibit of Messrs. McDonald & Willson, Ltd., in the Industrial Building was well located, and reflected intelligent display and good taste. The exhibit was divided into two rooms, one being set apart for electrical fixtures, artistically hung from panels in the ceiling. A table occupied the centre of the room, with a reading lamp on it, while a carpet of quiet design on the floor completed the furnishings. An Apex vaccum cleaner stood at one side all ready for use. Several fans occupied the counter. The second room, which was also carpeted, was given over to the demonstration of the Trojan electric washer. The Trojan is built on the same principle as the machines used in commercial laundries, the tub making one complete revolution and then reversing. The wringer takes three positions enabling the housewife to wring the clothes from the washing machine into the rinsing water, from the rinsing water into the bluing water, and from the bluing water into the clothes basket. A feature of the McDonald & Willson exhibit that aroused great interest was the prize contest in connection with the Trojan washer. The company gave away $500 in prizes in the form of discounts on the purchase price of a washer. Under this scheme fifty prizes were given away ranging from $5 to $50, according to the order in which the contest cards were drawn.

Northern Aluminum Co.

The Northern Aluminum Co., Traders Bank Building, Toronto, had on exhibit in the Industrial Building a shining array of polished aluminum kitchen utensils, and other aluminum specialties, including a large steam jacketed kettle for use in hospital kitchens. The booth was built up in tiers to the roof, giving the exhibit a very handsome appearance, and showing the different products to good advantage. Mr. Craik, who was in charge of the exhibit, also radiated confidence in the goods which he demonstrated. The company have just completed a ten-storey addition to their rolling mill at Sterling Road, which will increase their rolling capacity one hundred per cent.

Jones & Moore Electric Co.

The Jones & Moore Electric Co., 296 Adelaide West, had an interesting exhibit in the Machinery Hall of two and three-phase alternating motors, Century single phase motors, as well as electric fans of various sizes, artistically arranged.

Dominion Steel Products Co.

A large Dominion high compression oil engine of the Diesel type was on exhibit in the Machinery Hall by the Dominion Steel Products Co., as well as a machine for applying and demounting solid tire rims. The company also had an exhibit on the grounds of a small power plant outfit for use on farms. A very interesting illustrated booklet entitled "Light" can be had on request, giving a full description of the Dominion products. The headquarters of the company are at Brantford, Ont.

Henry Engineering Co.

The Henry Engineering Co., 71 Bay Street, had a neat and attractive booth in the Machinery Hall, exhibiting electrical instrument boards, Pierce renewable fuses, Cutler-Hammer motor control equipment, "Economy" tiering machines, steam jet ash convenors for power plants, etc.

Electric Dairy Machinery.

The Excelsior Electric Dairy Machinery, Ltd., Toronto, had an interesting exhibit of their Toronto Cream Separator in the Manufacturers' Building No. 2. The demonstration was of particular interest to rural visitors, as it showed the separator being driven by the Excelsior electric motor connected to the separator by means of a clutch pulley which permits of the speed being gradually picked up.

Eureka Vacuum Cleaner.

Much interest was shown in the Eureka vacuum cleaner, exhibited in the Electrical Building by the Eureka Vacuum Cleaner Co., 377 Yonge Street, Toronto. This machine has an interesting history, having been awarded the Grand prize and gold medal at Brussels, Belgium, Feb., 1920; Milan, Italy, July, 1920; Amsterdam, Holland, July, 1920, and the grand prize at the Panama Pacific Exposition, 1915-1916.

The "Crystal" Washer.

An interesting exhibit of the Crystal electric washer and wringer was shown in the Electrical Building by the Eureka Vacuum Cleaner Co., of Kitchener, Ont. The tub revolves in one direction, and all working parts of the machine are enclosed. The wringer locks in three positions, wringing the clothes from the machine into the rinse water, from the rinse water into the blueing water, and from the blueing water into the clothes basket. It is claimed to wash anything from the heaviest comforters to the daintiest fabrics without injury. Two levers constitute a simple control to the entire mechanism of the machine.

The Hoover Sweeper.

More than ordinary interest was aroused by the exhibit of the Hoover electric suction sweeper at the Electrical Building. Four models were shown, the Baby Hoover, for the small home; the Hoover Junior, for large homes and apartments; the Hoover Senior, for stores, office buildings, hotels and public buildings, and the Hoover Special, for medium-sized homes and apartments. The three main characteristics claimed for the Hoover are that it beats, sweeps, and suction cleans in one operation. The beating effect is produced by a brush having two spiral rows of soft hair bristles, revolving at a speed of 1,000 times a minute, the crest of the carpet being swept at the same time. The constant rush of air sucks the dust and dirt up into the bag. It is claimed by the makers that the Hoover not only cleans the carpet, but that any dirt under the carpet is drawn up right through the carpet into the bag by means of the powerful suction, characteristic of the Hoover machine. Any enquiries will be gladly answered by the Hoover Suction Sweeper Co. of Canada, Ltd., Hamilton, Ontario.

Lancashire Dynamo & Motor Co.

An instructive and educative exhibit was shown in the Electrical Building by the Lancashire Dynamo and Motor Co. of Canada, Ltd., 45 Niagara Street, Toronto, in the way of electric motors, dynamos, roller bearings, and motor parts. The most interesting feature of the exhibit, however, and one that brought many enquiries, was the "Orwell" electric truck operated by an enclosed 1½ h.p. motor, fixed by a double acting spring suspension to the underframe. This truck is used extensively in railway station, factory and warehouse trucking in England, where it is manufactured by Ransomes, Sims & Jefferies, Ltd., of Ipswich. The combination controller is situated at the front of the chassis and contains all the organs of the electric control. There are two independent brakes, both of the external contracting type, and steering is by a hand-wheel or tiller acting on centrally pivoted steering wheels, thus rendering it impervious to road shocks. The operation of the truck is controlled by the foot-pedal, main switch and tiller. The battery is contained in two boxes carried at the centre and rear of the underframe, equipped with 20 lead cells of 129 ampere hours capacity. The platform is made of well seasoned hardwood, bound at the edges with angle iron, and covered with sheet iron. A trap door in the centre gives easy access to the battery, motor and steering mechanism. The Lancashire Dynamo and Motor Co. have also been made Canadian agents for the "Orwell" three-ton electric vehicle, which they expect to be able to introduce to the Canadian trade in the next few months.

Canadian General Electric Company.

The exhibit of the Canadian General Electric Company in the Electrical Building was a representative one, embracing everything electrical from washing machines to electric toys. A toy electric railway in one corner of the exhibit was the [illegible] of great excitement amongst the children. For the woman, there was the C. G. E. sewing machine, the Thor washing machine, the Whirlpool electric dish washer, the Hot Point electric iron, the Premier electric vacuum cleaner, and the Hughes electric stove. Several styles of electric fixtures for the home were also on exhibit, and a large show case containing mazda lamps stood in the centre of the booth. An interesting feature was the test table shown by the company for testing sockets, rosettes and switchboards. Considering the variety of exhibits the booth presented a very neat, attractive and artistic appearance.

The Walker Dishwater

The Walker dishwasher was the subject of considerable comment at the exhibit of the Hurley Machine Co., Ltd., in the Electrical Building. The dishes are held in special trays, while scalding hot water is splashed over them by means of an electrically-operated paddle at the bottom of the tank. When the dishes are cleaned the power is turned off, the trays are lifted out and laid outside while the dishes dry by their own heat.

The 1900 Washer.

The Nineteen Hundred Washer Co., 350 Yonge Street, Toronto, had their well-known washer on exhibit in the Electrical Building. The 1900 washer works on a rocking principle, causing the water to swish through the clothes in a figure eight movement. All the working parts are enclosed. The wringer works at three different positions.

Square D Company

At their stand in the Electrical Building, the Square D. Company had a splendid exhibit of their well known safety switches. These safety switches are standing guard in hundreds of electrically operated factories against serious and costly accidents with consequent shutdowns, loss of efficiency, slowed-up production, labor trouble and actual monetary loss to the employer, through the carelessness or ignorance of employees. Any device which adds to safety in operation of any equipment adds to our national efficiency, and in this respect the Square D product is an important factor.

The Benjamin Electric Co.

The Benjamin Electric Mfg. Co. of Canada had an exhibit of their well known products at the Electrical Building, including electric lighting specialties of all kinds from panel boards and cabinets to two-way lighting plugs. One of the features was their push-button type panel board whose simplicity and compactness attracted many visitors. Another feature was their darning device which is not only a great convenience but a great money saver as well to the consumer.

The "Klymax."

One of the most completely equipped washing machines on exhibit at the Canadian National Exhibition was that known as the "Klymax," manufactured by the Slade Mfg. Co., of Owen Sound, Ont. The Klymax operates on the vacuum or suction principle; it is also equipped was a gas heater. When the clothes are ready for rinsing, a faucet is opened and the soapy water runs into a reservoir, while fresh water is run into the tub among the clothes. After the clothes are rinsed the water is again run off and the clothes are dried by means of centrifugal motion, the clothes being ready to iron if dried in this way for fifteen minutes. The second batch is washed in the original soapy water which is pumped back into the washer. The Klymax is of metal construction throughout, all parts coming in contact with water and clothes being made of aluminum, copper and brass. All bearings are fitted with bronze graphite bushings. The machine is equipped with ¼ h.p. motor, and is fitted with ball-bearing casters. All moving parts are encased, and the machine is protected against overloading by automatic adjustment.

The Apex Vacuum Cleaner.

Messrs. McDonald & Willson, Ltd., 343 Yonge Street, Toronto, had an interesting exhibit of their Apex electric cleaner in the Electrical Building. One of the outstanding features of their exhibit was the prize contest, whereby the successful lady contestant, at the close of the exhibition, received an Apex vacuum cleaner free. By means of this contest Messrs. McDonald & Willson have been able to obtain the names and addresses of hundreds of people, together with other valuable information, which they hope to turn to good account. All the demonstrators at the various exhibits of the company were very enthusiastic about the campaign, and confident as to the beneficent results to the company.

Prize Contests.

Whatever may be said for or against the principle of holding prize contests as a means of getting business—which was done at the exhibition by a prominent firm of electrical dealers—one thing is certain, and that is that such an effort, entailing so much thought and work, can only spring from the true pioneering spirit, born of the union of enthusiasm and service. It is this "want to sell" spirit that the Electrical News is so anxious to see take hold of the trade, and we would commend it to all electrical contractor dealers, leaving to their own imagination and originality the method by which they think that spirit can best be expressed.

Pipe-Thawing Outfit for the Coming Winter

By H. S. Rush*

A pipe-thawing outfit which can be operated from a 110-volt or 220-volt house service has been developed that may be operated safely without requiring great skill. The equipment consists of a 1.5-kva. transformer having 110-volt and 220-volt primary windings and a 16-volt secondary, 100 ft. to 125 ft. of No. 6 weatherproof copper wire in pairs for the secondary connections and 50 ft. of No. 14 drop cord for the primary connections. The current supply is obtained from a connection at the entrance cabinet of the house-lighting service, using the 220-volt connection where the service is three-wire. One secondary connection is made to the water pipe in the building and the other by means of a plumber's key attached to the shut-off cock at the street end of the service pipe.

The transformer capacity of 1½ kv.a. has been found sufficient for ¾-in. and 1-in. iron and lead service pipes. The thawing time ordinarily ranges from ten to thirty minutes, which compares favorably with the former method using a 10-kv.a. to 15-kv.a. transformer connected to the 2,200-volt primary circuit. Should the service be frozen between the shut-offs and the the connection may be made to a neighboring shut-off.

The transformer used is of the ordinary core type having a core made of sheets of stovepipe iron. The laminations are 1¾ in. x 6¾ in. and 1¾ in. x 9¾ in. The core is built up to a cross-section of 1¾ in. x 1¾ in., with the laminations dovetailing at the corners in groups of five. The opening through the core is 5 in. x 8 in. The primary winding consists of 520 turns of No. 12 magnet wire divided into two windings of 260 turns for paralleling when using 110 volts on the primary. The two halves of the primary winding are placed in series when using 220 volts. The secondary is made of 38 turns of No. 1 bare copper wire. The transformer is air-cooled and is mounted in a wooden case with a hole left through the box so that additional secondary turns may be threaded through to vary the secondary voltage if required. The complete transformer is 8½ in. x 14 in. x 13½ in. high and weighs about 55 lb. (25 kg.).

The current depends upon the resistance of the service pipe, usually 80 amp. to 110 amp. on the secondary side and 11 amp. to 16 amp. on the primary.

Census of U. S. Power Stations

A census of electric light and power stations of the United States has just been made public by the Bureau of Census, Department of Commerce, Washington, D. C. The figures are correct up to 1917, and is the most comprehensive census of the United States central station situation that has ever been published.

So far as numbers are concerned, municipal plants are making rapid headway in the United States. The total number of municipal stations is now 2,318, as against 4,224 private plants. This is not a fair indication, however, of the generating capacity which is twelve millions for the private plants and less than one million for the municipal plants. Table I. gives some interesting information regarding the capitalization, capacity, disposal of current, etc., of these plants.

A sub-division is also made of the generating stations into water power, steam power, etc. The total horse power developed is given as 12,875,522. Of this total, steam engines and steam turbine to the numbr of 7,300 develop 8,391,816 h.p. Water wheels and turbines to the number of 3,358 develop 4,274,479 h.p. Internal combustion engines numbering 2,914 develop 209,227 h.p. The State of California has more hydro-electric development than any other state with 1,114,356 h.p. New York state ranks second, with slightly over 800,000 h.p., and Michigan third, with 500,000 h.p.

The average lighting rate for all plants in 1917 works out at 5.5 cents per kw. hr., and the average power rate is 1.2 cents per kw. hr. The highest light rate reported is 10.7 cents and the lowest 3 cents. The highest power rate reported is 4.3 cents and the lowest 6 cents. The average rates charged by municipal plants were much higher than those charged by private plants.

Table 1

	Commercial Plants 1917	Municipal Plants 1917
Capitalization	$3,117,809,898	$127,375,200
Number of stations	4,224	2,318
Value of plant and equipment ...	$2,933,016,941	$127,375,200
Total income	$486,634,021	$40,260,217
Light, heat and power	$462,473,917	$39,586,061
All other sources	$24,160,104	$674,156
Total expenses, including salaries	$395,127,395	$31,440,912
Total number of persons employed	94,679	10,862
Prime movers		
Number	10,387	3,408
Total horsepower	12,077,657	859,098
Dynamos		
Number	9,991	3,437
Kilowatt capacity	8,411,944	582,463
Output of stations: (total)	29,812,190,746	1,231,858,488
Kilowatt-hours generated ...	24,398,983,183	1,039,320,089
Kilowatt-hours purchased ...	5,413,207,563	192,538,399
Stationary motors served:		
Number	501,801	[illegible]
Horsepower capacity	[illegible]	[illegible]
Disposal of current, 1917:		
For light	4,445,217,785	667,299,164
For power	12,833,191,106	341,636,171
To other public service corporations	**7,444,108,488**	**20,512,086**
Other purposes (non-revenue)	821,522,389	9,951,558
Distribution and line losses ...	4,268,150,978	192,459,509

---

*Associate Professor of Electrical Engineering, State School of Science, Wahpeton, N. D., in Electrical World.

Accidents are Lessened by the More General Use of One-Man "Safety" Cars

Statistics Quoted Cover Operation of Thirteen Railway Systems over a Period of Five Months—The Car has Sold Itself to the Public

By W. H. Burke*

From time to time some of the newspapers have given considerable publicity to a few more or less minor street railway accidents in which the safety of one-man car has happened to be involved. In most cases these accounts have not been unfriendly to the car. The press in general has been among the first to see the tremendous advantages which the safety car has over the older type of rolling stock in the way of faster and more frequent service. Hence it is clear that any exaggerated impression of the accident hazard which these newspaper reports may have conveyed has been the result of a misunderstanding of the facts in the situation and that they were not in any sense prompted by a feeling of hostility. Nevertheless, in many cases they have laid a great deal more stress on the one-man feature of the car than the importance of the particular accident or the circumstances surrounding its occurrence would warrant.

In the early days of the safety car it was not unnatural for the layman to feel that there was an inherent accident hazard in a car operated by one man which would not be present in a two-man operated car. The safety car was an entirely new departure, and naturally the public did not understand its mechanism nor the fact that the safety features embodied in its design, with the added advantage of responsibility for its operation being lodged with one man instead of two, were bound materially to reduce the accident hazard rather than increase it. Unfortunately, however, there were no tangible results or actual figures available in the early days to prove this, and in the circumstances it is remarkable that practically no popular opposition developed on this score.

The answer is to be found, of course, in the appeal which the car immediately made to the public on account of the faster and more frequent service which it made possible. Its popularity is best evidenced by the fact that, although it was not developed on a commercial scale until late in 1916, more than 5,000 safety cars were in use or on order by the end of May this year, and this number of course is considerably greater at the present time. One of the large car builders is authority for the statement that more than 75 per cent. of all the cars purchased in 1919 by the electric railways of the United States were of the safety type. Furthermore, this record has been made in the face of the most serious financial conditions which have ever confronted the street railway industry.

Practically all of the Public Service Commissions which have passed on the matter have indorsed the car, and in at least one recent case a commission criticised the management of a large Western property for not having taken advantage of the safety car and the economies in operation which it makes possible.

The simplicity of the car's operation is evidenced by the fact that in one Middle Western city, where the Birney safety car is used exclusively, the service was operated entirely by women during the war and with wholly satisfactory results from an accident as well as from every other standpoint.

Roads Selected for Comparison

In spite of the fact that the car has already sold itself to the public and is now generally accepted as the greatest advance step in street railway transportation since the electric railway motor was first developed, it is worth while to consider the actual results which have been achieved from an accident standpoint, if for no other reason than to vindicate the judgment of the early advocates of the safety car idea. With this thought in mind a careful analysis has been made of the accident records of thirteen representative street railway companies covering the first five months of the current year.

All of these companies are under Stone & Webster management and are widely scattered, their geographical location being as follows:

Texas..........	4	Iowa..........	1
Washington......	3	Kentucky........	1
Florida...........	1	Louisiana	1
Georgia..........	1	Canada*..........	1

These thirteen companies serve a combined population of about 1,000,000 people and during the period in question operated more than 12,000,000 car-miles and carried more than 70,000,000 passengers, exclusive of those using transfers. The safety cars in these cities are operating under all kinds of conditions as regards street and traffic congestion, and in at least two of the cities this congestion is as serious in sections of the business district during rush hours as will be found anywhere in the country. As of May 31, these companies owned approximately 400 cars equipped for one-man operation.

It should be stated further that the figures used herein are not for any group of especially selected companies, nor are they for certain selected lines of any particular companies. On the contrary, they include all of the companies under Stone & Webster management where any appreciable number of safety cars are being operated.

These facts are set out to show that the data given are representative, and if the accident record of the safety car as compared with the ordinary two-man car is favorable under these circumstances it would seem to be pretty conclusive proof that from an accident standpoint alone, and entirely aside from its many other advantages, the car has vindicated the judgment of its many advocates; also that it is reasonable to expect similar average results on any other street railway property as far as the accident situation is concerned.

---

*[illegible]

*Nova Scotia Tramways & Power Co., Halifax, N.S.

The summary in Table I shows the passenger car mileage and passengers carried (excluding transfers) divided as between safety and two-man cars. These figures are reproduced merely to emphasize the widely varying conditions under which the safety car is being operated on the thirteen properties under consideration.

Table 1—Car-miles and Passengers Carried on Selected Group of Thirteen Stone & Webster Properties, First Five Months of 1920

	(Transfers Excluded) Passengers Carried		Operated Passenger Car Miles	
	Safety Car	Two-Man Car	Safety Car	Two-Man Car
Baton Rouge, La*	120,700	0	1,006,700	0
Beaumont, Tex.	325,000	192,700	1,439,600	1,537,800
Bellingham, Wash.	379,500	58,800	1,467,000	256,300
Columbus, Ga.	240,200	167,600	1,107,300	1,192,100
El Paso, Tex.	736,700	478,000	3,731,300	3,140,200
Everett, Wash.	352,900	15,200	1,821,600	213,200
Fort Worth, Tex.	924,600	1,407,500	5,037,900	10,715,400
Halifax, N. S.	134,400	631,500	947,100	4,618,000
Houston, Tex.	731,300	1,616,800	3,625,200	11,595,300
Keokuk, Iowa*	109,700	0	508,900	0
Paducah, Ky.*	259,400	0	1,036,300	0
Tacoma, Wash	962,700	953,800	4,035,700	5,122,500
Tampa, Fla.	685,600	557,400	3,407,900	3,222,400
Total	5,962,700	6,079,300	29,172,500	41,613,200
Per cent of total	49.5	50.5	41.2	58.8

* 100 per cent safety-car operation.

Accidents, Total and Per 200,000 Passengers, Compared

In reporting accidents all of these companies use the classification of "accidents and occurrences" adopted at the 1916 convention of the American Electric Railway Association Under this head is included every accident or happening on which an accident report is turned in. These, in turn, are segregated as between "important" and "trivial." Accidents reported as "trivial" are those where there is no injury or damage, or where the injury or damage is very small. Generally speaking, "trivial" accidents cover those where there appears to be no liability on the part of the company and which would hardly be considered important enough to report except as a matter of protection in case a claim should later result. All accidents other than "trivial" are classified as "important." A similar plan is followed in classifying personal injuries.

The total number of "important" accidents on all of the properties segregated as between safety and two-man cars and the number per 50,000 car-miles operated by each type of car were, for the first five months of 1920, as shown in Table II.

These figures show that that on a car-mile basis **the average number of accidents for the two-man car is substantially 70 per cent. greater than for the safety car.** Except for collisions with automobiles, where the figure for the two-man car is somewhat lower, the comparison is overwhelmingly in favor of the safety car. Furthermore, even in the matter of collisions, the showing favors the safety car slightly when collisions of all kinds are considered (Items 1 to 4c inclusive), the number per 50,000 car-miles being 1.95 for the safety car and 1.99 for the two-man car.

Table II—Accidents Classified as "Important" on Thirteen Selected Properties During First Five Months of 1820

		Total Number		Number per 50,000 Car-Miles	
		Safety	Two-Man	Safety	Two-Man
1	Collisions with pedestrians	20	37	0.17	0.30
2	Collisions at railroad crossings (other than company's)	1	0	0.01	0
3	Collisions between cars of company	17	24	0.14	0.20
4_a	Collisions with automobiles	178	154	1.49	1.27
4_b	Collisions with vehicles	14	21	0.11	0.17
4_c	Collisions with animals	4	6	0.03	0.05
5	Derailments	9	12	0.08	0.10
6	Equipment	2	12	0.02	0.10
7	Boarding cars	3	52	0.03	0.43
8	Injuries on cars	16	41	0.13	0.34
9	Alighting from cars	25	120	0.21	0.99
10	Falling from cars (not purposely alighting)	1	3	0.01	0.02
11	Stealing rides	1	2	0.01	0.02
12	Doors, gates and guards	6	9	0.05	0.07
13	Miscellaneous	32	71	0.27	0.58
		329	564	2.76	4.64

The figures show in a striking manner the advantage which the safety car has as regards boarding and alighting accidents, the number of these two classes of accidents per 50,000 car-miles being 1.42 for the two-man car as compared with only .24 for the safety car. The two-man car operated an average of 35,300 miles for each boarding and alighting accident, while the safety car operated 213,000 miles; the two-man car carried 241,900 passengers (transfers excluded) for each boarding and alighting accident and the safety car 1,042,000 passengers.

Step Accidents Materially Reduced.

Step accidents have always been the bane of the claim agent's existence. They are not only costly but they involve life and limb to a much greater extent than does any other common form of street railway accident and, therefore they are of greatest moment to the car rider. The fact that they are all but eliminated with safety-car operation is a tremendously strong point in its favor.

Out of 329 important accidents with the safety car there were 207 personal injuries, while with the two-man car with 564 important accidents there were 446 cases of personal injury, the percentage of personal injuries being 63 for the safety car and 79 for the two-man car. This indicates, as would be expected, that the accident results are likely to be less serious with the light-weight car than with the heavy two-man car.

Table III—Accidents Classified as "Important" per 200,000 Passengers on Thirteen Selected Properties During First Five Months of 1920

		Number Important Number per 200,000 Passengers (Transfers Excluded)	
		Safety	Two-Man
1	Collisions with pedestrians	0.14	0.18
2	Collisions at railroad crossings (other than company's)	0.01	0
3	Collisions between cars of company	0.12	0.12
4_a	Collisions with automobiles	1.22	0.74
4_b	Collisions with other vehicles	0.09	0.10
4_c	Collisions with animals	0.03	0.03
5	Derailments	0.06	0.06
6	Equipment	0.01	0.06
7	Boarding cars	0.02	0.25
8	Injuries on cars	0.11	0.20
9	Alighting from cars	0.17	0.57
10	Falling from cars (not purposely alighting)	0.01	0.01
11	Stealing rides	0.01	0.01
12	Doors, gates and guards	0.04	0.04
13	Miscellaneous	0.22	0.34
		2.26	2.71

The accidents classified as "trivial" are not of sufficient importance to warrant showing the results in detail here. The figures show an average of 16.2 trivial accidents per 50,000 car-miles for the safety car and 24.9 for the two-man car.

Based on the comparative number of passengers carried, the showing as to number of important accidents is again very materially in favor of the safety car, as is shown in Table III.

Expressed in another way to show the average number of car-miles operated and passengers carried for each important accident the combined results for the thirteen companies are:

	Number Car-Miles per Accident	Number Passengers Carried per Accident
Safety car	18,124	88,670
Two-Man car	10,779	73,782
Total	13,485	79,267

In some of the more recent wage arbitration proceedings it has been contended that the safety car introduces an additional hazard for the operating employee and this has been used as an argument for higher wages than might otherwise be justified. As an example of the extreme to which such a claim may be carried, considerable stress was laid on some testimony in a recent wage case of a large Eastern property to the effect that a safety car had skidded for some distance on a bad rail because the emergency sander had failed to operate. The fact was later developed that no damage had resulted and that the failure was due to the sandpipe having been clogged with stones. Under similar circumstances a heavy two-man car would probably have skidded considerably further and the chances of a serious accident would certainly have been greater. In other words, the argument in this case was, if anything, in favor of the light-weight car rather than against it.

The detailed figures from which the data as to the number of accidents were compiled show the following as to employees' injuries for safety and two-man cars:

	Car Miles per Employee Injured Important	Trivial
Safety Car	542,075	156,917
Two Man Car	129,349	51,961

As far as the hazard to the employee is concerned it appears that disregarding trivial accidents the odds are more than four to one in favor of the safety car.

As regards the comparative money cost of accidents for safety and two-man cars the records of the companies in question show that for the first five months of the current year they paid out 4.16 per cent. of their combined passenger revenue for accident settlements. These payments do not, of course, correspond exactly with the accidents occurring during this period. Some of them applied on prior claims, while on some of the accidents which have occurred during this period claims are still pending. However, with as large a group of companies as is being considered here the effect of this difference should affect the results but little if at all, and the fact that the percentage of earnings paid out for accident settlements during this period corresponds almost exactly with the average for the entire year 1919 indicates that this assumption is a reasonable one.

The amounts paid out in setttlements per 1,000 car-miles for the five months period are as follows:

Safety cars	$10.00
Two-man cars	15.00

The thirteen companies operated an average of 255 eighteen-hour safety cars and 245 eighteen-hour two-man cars during this period. On this basis the safety car shows an annual saving of $300 per car per year in accident cost, or substantially $75,000 for the 255 eighteen-hour cars in operation on a car for car basis, combined with two-man equipment, quite a respectable sum in these days of high operating costs.

Briefly, the above analysis, covering operations under such widely varying conditions as to make the information thoroughly representative and extending over a sufficient period of time to make it conclusive, shows:

(a) That the average number of accidents on a car-mile basis is about 70 per cent. greater with the heavy two-man car than with the light-weight safety car.

(b) That the average number of accidents on the basis of passenger carried is 20 per cent. greater with the two-man car.

(c) That the accident risk from the standpoint of the car operator is overwhelmingly in favor of the safety car.

(d) That the accident cost is about $300 greater per car per year with the two-man car.

(e) That in proportion to the number of accidents the number of personal injuries is 25 per cent. greater for the two-man car.

As the use of the car is still further extended, sporadic attempts may be made in some cases to show that the term [illegible] great concern provided the car is being properaly operated, because it is then its own best and most convincing argument against claims of this nature. Furthermore, those responsible for such claims can make no great headway without the support of the car rider, and this, judging from past experience, will not be forthcoming.

Like any other mechanical equipment the safety car requires a reasonable degree of care and intelligence on the part of the organization which is responsible for its operation. In the hands of a prejudiced operator, favorable results are not to be expected. Careless and reckless operation will involve accidents with any type of equipment, and in this respect the safety car is no exception to the general rule. Run at high speeds in heavy traffic, any car will, sooner or later, kill some one. Operated at dangerous speeds over bad track, any car will sooner or later be ditched, with the usual attendant results. The safety car is not infallible. No one who understands the situation, and least of all the operating men, who have been largely responsible for its success, and to whom the lion's share of the credit belongs, will claim that it is immune from accidents. They will contend, and with good reason, as the figures given above amply prove, that given a square deal and operated according to the dictates of ordinarily good street railway practice its accident record is decidedly better than that of any other type of car developed.

Would Motor Buses Solve or Help to Solve Toronto's Transportation Problems?

The Bureau of Municipal Research of the city of Toronto has prepared a quantity of information covering the operation of motor busses in a number of cities in the United States. We note below extracts from their report:

The old stage coach which served our fathers and grandfathers is with us again, in the guise of the motor bus. The motor bus has all the advantages of its prototype and none of the disadvantages. It has the obvious advantage of mobility over the street car;; but is it feasible in our climate Can it supplant street cars or only supplement or feed them Can it serve the suburbs only? Or, will street cars retain their hold on the suburbs, while the motor bus serves the down town districts, at least for local traffic? What have been the actual results of operation elsewhere? While much has been said about the theory of motor bus transportation, comparatively little has been said about its actual operation. To make a beginning in this direction, the bureau has made enquiries in various matters. While information was not available in many instances, the material received has been tabulated and is presented herewith.

The following personal experiences secured from various correspondents are also of interest:

Akron, Ohio: "Our own experience here at Akron with the Goodyear Heights line is proving very successful from the standpoint of being able to move the residents, who are practically all Goodyear employees, to and from work."

Detroit, Mich.: "The buses run over a regular route and on schedule as regular as that of an electric railway."

Los Angeles, Cal.: "The interurban motor service has become an important element in transportation and is in competition with the interurban and steam railways throughout southern California. There are three classes of motor bus service, viz.: local service in competittion with street cars; local service not competing with street cars; and in-

Summary of Information Received Regarding Motor Bus Operation in America

CITY	Character of district served	Length of journey	Fares Charged	Capacity of buses—passengers seated
AKRON	Business and residential	1 to 3 miles	5c. cash	30
CHICAGO	Business and residential		10c. cash	——
DETROIT	Business and residential	4¾ miles	10c. cash	48
HUNTINGDON	Interurban		5c. cash and up	20 to 30
HOUSTON	City and suburban	Up to 50 miles	5c. cash and up	5 to 7
KANSAS CITY	Business and residential	2 miles	5c. and 10c cash	20
MILWAUKEE	Residential	3 miles	Buses are feeders to street cars	20
MINNEAPOLIS	Business & interurban	10-28 miles	Various	14 to 26
NEW YORK	Business and residential	6½ miles	10c. cash	40
LOS ANGELES	Residential sparsely settled	3 to 7 miles	5c.-20c.	15
	Interurban sparsely settled	30 to 130 miles	3c. per mile	Up to 28
PASADENA	Principally suburban and interurban	25 to 35 miles	Various—less than electrics	14 to 20
SAN FRANCISCO	Residential		5c. fare	30
TOLEDO	Business and residential, crosstown	3 to 4 miles	5c.-6c. cash	15

terurban service competing with both steam and electric lines. The types of machines used are converted touring cars, or one-ton trucks with special 15 passenger bodies. Certain bus lines issue transfers to other bus lines, with no extra charge. There are approximately 300,000 passengers hauled out of the Union stage depot here each month."

Minneapolis, Minn.: "Each bus averages 100 miles a day, with an average of 100 minutes a round trip (of 20 miles). Each bus will average 150 passengers a day. The operators of the cars are paid a per diem rate, plus a commission. This provides an incentive for overloading the buses at times."

New York, N. Y., (municipally-owned line): "Certain trolley lines . . . ceased rendering to the public the service required by their franchise . . . The bus was introduced as a makeshift. However, on Sept. 1, 1919, the operation of motor buses was commenced under the supervision of the Plant and Structures Department . . . There are now operating on 25 routes, 400 buses, each carrying passengers at the same 5c fare, but twice as quickly as the abandoned trolley lines. About 300,000 passengers are carried each day. I confidently estimate a net profit of $540,128 a year."

Cost of Operation.

The only systems with regard to which the bureau could obtain authoritative data on the cost of operation were those of San Francisco, municipally owned, and Akron and New York, both privately owned. San Francisco, with 6 buses operating as feeders to the street railway system at a cost of 23.6c a bus mile, reports a deficit of 11.6c a bus mile, on a 5c fare.

The Akron line, with 8 buses, reports a total cost of 36.78c a bus mile, which includes overhead. Being operated by an industrial concern, principally for the benefit of its employees, the buses are managed so as to produce no profit and no loss. These buses charge a 5c fare for a run of from one to three miles, the average journey per passenger being about 1¾ miles. The cost per passenger in 1919 was about 4 1/16c.

The cost of operation, per bus mile, on the privately-owned Fifth Avenue line, New York, with 300 buses, is given at 41.55c, not including certain unstated overhead charges. The fare is 10c., and the venture is said to be profitable, although no statement of profit and loss was obtained from the company.

From a study of the replies received it was obvious that these figures are not closely comparable, as the headings for the different items entering into the total costs were not uniform.

What About Toronto?

Would an Experiment in Motor Buses for Toronto be Justifiable?—The profitable operation of a motor bus line in any section of a city depends upon the relation of the number of passengers,, and the fares charged, to the cost of operation.

It is impossible to estimate, without detailed study, how many people would patronize the motor bus, if installed as an auxiliary to the street railway in any particular section of Toronto, but the cost of operation can be estimated and the number of passengers required in order to meet expenses at a 5c. or 10c. fare can be determined. Taking the maximum unit costs reported as a basis for computation, the cost per mile per bus in Toronto would be 45.61c. This cost might prove to be even greater, due to the higher cost of gasoline and also to climatic conditions. Assuming these costs to be approximately correct for Toronto, at a 5c. rate at least 10 fares a mile would be necessary in order to make the system profitable. At a 10c. rate, 5 fares a mile would be necessary.

North Toronto has, according to the assessment department figures, a population of about 12,110. This is an increase of 40% over 1914. The civic transportation committee reported, in 1914, that the passenger movement into North Toronto, from street cars and jitneys, was about 4,000 persons in one day. If this be increased by 40% (the rate of growth of population), there will be at least 5,600 people now requiring daily transportation to and from North Toronto.

Eight buses in Akron carried at the rate of about 5,600 persons a day for 312 days in 1919. These buses cost about $48,000, and are operated on a "no profit, no loss" policy at a 5c. fare. They travelled over brick paved streets which were in bad condition as a rule." North Yonge Street is macadam, in fair condition, and there are several cross streets paved with asphalt and concrete.

It must be noted that in every city in which buses are being operated, with any degree of success, they supplement rather than supplant streets cars and rapid transit systems.

Willard Battery Co.

The Willard Storage Battery Co. have acquired, at a cost of $70,000, three acres of land on Wiltshire Avenue, Toronto, where they intend to start at once the erection of the first unit of a series of buildings for the manufacture of their batteries in Canada.

The Contractor-Dealer

What Can The Electrical Contractor Do to Help Himself?

Make Friends—Become a Specialist—Be On the Lookout for Chances to Expand—Co-operate with Others—Give Service—Keep Promises

By W. E. Robinson*

I have watched for twenty years the evolution that has been occurring in the electrical industry. It is my opinion that the members of the electrical industry were never as great as they are today. I have never known the time when there were bigger chances in the industry than there are today, unless perhaps it be in the great manufacturing organizations.

There never has been a time when it costs as little to be a contractor as it does today. It costs you the same today as always. And I want to develop that thought, and point out where the opportunity lies in the electrical contracting business as well as in the field of merchandising. The genesis of the electrical contractor is still the journeyman lineman. It does not take $100 to go into the contracting business today, at least not any more than that, and that is what it cost twenty-two, twenty-five or twenty-eight years ago.

Novices Can Wire Houses.

There will always be competition in the wiring of houses. Do not pay much attention to this theory that there is anything complicated about it. Remember, the barber that shaved you this morning wires his own house. The work is simple. Any one who can keep two lines running parallel can wire a house. He may not make as good a job as a first-class mechanic, but he can make as safe a job.

You are always going to have a lot of new contractors coming into the field. It does not require capital, and it does not require much experience. I know the barber that shaved me in the hotel wired his own house, and I have seen butchers that wired their houses. Any carpenter can become a pretty good electrical contractor if he confines himself to the wiring of houses. That is always going to be highly competitive.

The man who is in the contracting business, and confines himself to wiring, is gaining competition all the time. Just as soon as he gets a certain amount of business on his books, enough so that he has to have his foreman look after a certain part of it, and does not himself supervise so as to keep in personal touch with his customers—when that time comes, the bright fellows among your workmen are going to quit and go into the contracting business for themselves.

With $1 an hour, possibly $1.25 an hour, and a restriction of eight hours a day, with a chance of working ten or twelve hours if you are your own boss, the chance of making $10 to $20 a day working for yourself without restriction, plus the possibility of making a profit on the material sold, is a very attractive field to the man who is your workman, if he has any credit and has saved a little money.

You find the same thing is true in relation to shops where you do repair work. If you do armature repairing and the repairing of apparatus, you send your man out on the job, and he gets acquainted with your customers—they know him and they dont' know you—they know he is the fellow who comes and fixes the trouble, and it is not very difficult for the customer to believe the fellow who is doing this difficult work apparently has brains, and if he says, "I can do this cheaper; I am going into business for myself and would like your patronage," the customer is pretty apt to try him out. The fellows who are building up repair businesses are finding that their own men are going out in competition.

I have watched this process going on for twenty-odd years. I think it is going to keep on, and I don't know but what it is a good thing, because we need contractors who will do the unattractive work, which is the wiring of houses. There is not a contractor of experience but who knows that unless he can get a farly large sized house, or a fairly decent sized job, on account of the time it takes to finish that job from when he begins it, especially if it is a new house and he has not a lot of similar work in the same neighborhood, no matter how much profit he thought he put on it, the chances are he is not going to make a cent, because the job will drag for months and months. That work has got to be done, however, and the little contractor can do it.

Should Become Specialists.

But to men who are analytical, who are studying not only what is happening to their own business but the operations in the industry, the time for specialization arrives, when you have to have something besides a very little energy and a very little capital in order to insure for yourselves a first-class place in the business and satisfactory returns for your experience.

So in the contracting field today, we find that where you get big jobs that require engineering experience and organization and the ability to finance your proposition through to a finish, your competition is relatively limited. In every town that I know anything about there are a few big ones at the top, and they seem to get along pretty well in the contracting business.

Now let us look what is happening in our industry. You know that in the development of lighting and the studies that have been made on efficient lighting, that there can be a large increase in the productivity of mechanics in the factories and clerks in the mercantile establishments, banks, and so on, through proper lighting. What does the ordinary wireman know about lighting? You are not selling a fixture, but you are selling a result. Specialize on selling to the manufacturer, the bank, or the merchant increased production by the proper use of light. Lay out his plant and do the engineering for him, and you will find it is not time misspent.

It will require a little application and a little careful thought, but get the main things that are essential, because there is not a man of intelligence in the electrical contracting field that cannot see an opportunity to benefit a manufacturer or merchant or bank, in increasing the eye comfort, efficiency and health of the employees in that factory, or bank, or mercantile establishment, and at the same time make the change pay the man, merchant or manufacturer.

You have something to sell that the average little contractor has not. You are keeping up with the business, and you are selling something that he wants but does not know how to get, and if you believe you are going to benefit, and have grasped the essentials, you can confer on him a blessing. and reap a reward for yourself.

---

*[illegible]

Another Specialty.

You hear all this talk of the evolution that has occurred and is occurring in the automobile industry., There is the selling of batteries and electrical equipment for ignition and lighting. The storage battery business is running into hundreds of millions a year. Every car either is equipped or will be, and every new car is. That is a field that is worth while.

Contractors ought to avail themselves of that field by specializing a few men in each community. They have largely let it go to garage operators, who do not know much about the battery, and do not know much about the lighting, but they are in that business and they are selling a great many dollars' worth of storage batteries a year. And the renewal on that business is going to be enormous.

Consider for a minute the opportunity that lies in the fact that instead of a few motors in a city and industrial centres, there are hundreds being added, and thousands, every year, and a field is being developed in the line of service motors for industries.

Millions of dollars' worth of equipment are being purchased every year in the large industrial centres. There has got to be service, for everything wears out. I do not care who makes the equipment, or how good it seems to be, nothing remains perfect that you are using. It is bound to wear out. A properly equipped plant for repairing, plus a stock of merchandise, repair parts of all kinds, good service, having capital machinery, as well as organization, takes you out of the line of fool competition.

Then there are the washing machines, electric ranges and vacuum cleaners. I think I saw somewhere that a hundred million dollars' worth of them were going to be sold this year. Vacuum cleaners are running into the millions. You cannot buy a range, not because the manufacturer does not want to sell it, but because they are oversold. They are six months to a year and a half behind.

Large Field for Future.

What is going to be done when all these things get out of order?. They will have to be fixed. Who is going to fix them? All these thousands of washing machines, vacuum cleaners and ranges that are being used must be repaired.

In every town the contractor merchant as well as the central station, if it merchandises, and the dealer, are vitally interested, or should be, if they can see beyond their noses in co-operating to help some one or more, for the field is big enough, contractors to specialize in equipping a shop and taking care of this business. This business must be served, if this tremendous field that is opening is to be properly equipped and full advantage taken of it.

Equipment calls for investment of capital, to be sure. It also means investment in repair parts, where you can give service. But you immediately step out of the class of fool competition, and are in a class where there is opportunity to make money, and where there is responsibility, because the only competitors you will have in that field will be competitors like yourself, who have an investment, and know what an overhead is, and are not fussed if they lose an occasional job, knowing the service they render is good service, and will justify their continued existence at a profit.

Another field in contracting that is opening up is the development of heavy heating appliances for industry and utility purposes, and the installation that goes with them. To sell two to five million dollars' worth of heating appliances for a bakery, large hotel or restaurant, and about half as much more in installation work, is not a rarity, and the business is growing.

Process of Evolution.

Now let us see if there is not just as much money for the contractor who has aptitude, to specialize in the electrical contracting field and make for himself just as great a future as he could if he tries to be a merchant. In the industry we have had a tremendous amount of emphasis placed upon the need of retail distribution in the electrical field. There is no question about that. But the man who is a good contractor, whose aptitude is along electrical mechanical lines, if you please, will find as great a future in that field as he will in the merchandising field, for which perhaps he is not equipped temperamentally.

You cannot make a merchant by resolution. You make a merchant by evolution. In the same way, you cannot make a big, successful engineering contractor by resolving that you are going to be one. Every successful man I have ever met has started somewhere near the bottom and has worked up.

I suggest these remarks for your consideration, because they may be helpful to men in the contracting field who feel that perhaps over-emphasis is placed on their becoming merchants, when they do not want to be merchants. I cannot imagine the contractor in any large industrial centre, who has a real business and a real organization, shifting and becoming a retail merchant. And I cannot imagine men, where their own aptitude, plus experience, is along electrical mechanical lines, leaving that branch of the business, where they are best qualified to serve, and becoming half-baked failures as merchants.

Whether a man goes into the merchandising field, or whether he sticks to the contracting field and specializes in it, because there lies the opportunity for profit and for a contented old age, rather than just keep doing the same thing over and over again, and keep meeting the same competition, depends upon yourself. With one hundred contractors in the field of wiring houses today, eighty of them fail during the year, and at the beginning of the next year there are still one hundred. Do not even think of it! Get away from it!

When I talk to you men like that, I know I am talking to men who have gotten away from it. I cannot do you any good. But if you can advise with the other fellow how to become more successful, how to get away from this fool competition, you will help yourselves. If you are a merchant, and you can get him to turn his attention, if he has the opportunity, to render a specific service, either in the line of domestic appliances, like washing machines, ranges, and so forth; or factory equipment, motors, generators, switchboards, and so forth; or for automobiles; or specialize in heavy service, heating appliances that apply to industry, then you will have helped him and helped yourself, and that is always worth doing.

Make It Profitable.

I believe that the only kind of co-operation that stays is the kind that pays. You have to make money, and the other fellow has to make money—both must profit. If only one makes it, you may think you have gotten away with something, but it will not last over night, because you cannot trade on the assumption that the other fellow is the fool and you are the wise guy. Any scheme of co-operation must be mutually profitable.

Let us look for a moment at the evolution that has been occurring in the electrical industry. Twenty-five, or say a little over thirty years ago, possibly forty years now, anyhow within the lifetime of most of us here, manufacturers discovered that they could use an arc lamp that was invented—also incandescent lamps. The manufacturers who made these things, licensed other groups of men to use them in their communities. That is the genesis of the central station. First, the manufacturer owned the thing, strongly covered by patents, and nobody could have them unless he licensed out a certain territory and said, "You can use them here for so much money."

The central station grew with the manufacturer, and all felt that the manufacturer and the central station were the only branches of the industry to be consideredd.d And they were the only branches. There were not any contractors or dealers in those days. There was not anything to be contracted for, and there was not anything to deal in. The central station bought from the factory and put them in. They did their own wiring, or else the factory did the wiring, to be sure the thing would work.

The business grew and grew, and then industrial plants began buying. People did not want their work done by the central station, for they could not get it done as promptly as they wanted it, so men began to find their way into this field, and to serve the public. As the necessity in the uses of electricity grew beyond the province of the central station to care for, opportunity was open for others to enter the field.

Room For All.

With it all one should bear in mind that the matter is impersonal. I hear talk about the fellow that gets the contract away from you, and you are feeling bitter about it. That is nonsense. That is water that has gone by the mill, and it does not make any difference whether he was a good fellow or not. He got the order, and you did not, and the thing to do is to study whether he got it through fool competition, or whether he got it on account of good salesmanship.

You will get your share at your profit. You cannot change him very much. Evolution will do that. He will either go through and pay the price of success, or he will fall by the wayside and go out.

There never has been a time, and I think perhaps it may be that over emphasis has been placed on this, when so much money was being spent by manufacturers and by jobbers to help the contractor-dealer, the contractor who wants to become a dealer, and become a successful dealer. Bookkeeping systems, which have been worked out under the care and supervision and through the initiative of the Contractors' Association, are being put into a great many contractors' establishments and contractor-dealers establishments, through the co-operation of the auditors of jobbing houses.

They want to help, as far as they can, to make the contractor, or the contractor-dealer, who is their customer, a good credit risk. Any other assumption is erroneous. Where the credit risk is all right, and the man is running his business, neither the manufacturer nor the jobber is going to spend any money on that house. They do not need to. But they are spending it where they feel that it will be beneficial to both concerned—the contractor-dealer, who is a customer, and themselves. And you will find money spent continuously over a period of years in co-operative effort, where the advantage is mutual.

Interests in Common.

The reason the jobbers are interested in trying to help the contractor-dealer largely is because they feel they understand the contractor-dealers' point of view—know how to deal with him—know that the interests are largely mutual, and then they want to take the road of least resistance—in other words, sell to the fellow who happens to go into the business, whether he be a drug store, or hardware store, or what. Because he is interested in the long pull—not in today's business, for that cuts no figure. They would not spend a dollar in educating contractors to become merchants on the theory they were going to cash in next year or the year after. It would not be worth while, because they cannot get their money back. Anybody who tells you they can does not know what they are talking about. Experience has proven you cannot do it.

What they look for, what every successful jobbing house looks for, and what every successful manufacturer looks for, if he is establishing direct, and they still are establishing direct connections with contractor-dealers, is that the man possesses character—he has got to be honest, he has got to be industrious, he has got to possess courage, and he must be patient. These are the four things that have to do with character. The man who lacks interest cannot get very far. The man with interest, who is not industrious, will not get very far. A man may be both honest and industrious, but if he lacks patience he will not stick until he wins out.

When you are investing your time and money in an individual, you want to be sure that certain elements are there before you make your initial investment, because that is about the beginning. These things are things of character. And with character to succeed you have got to have intellect, observation, keen observation. Profit by the mistakes—profit by what you see—get the facts of what you see through your observation—whether observation by reading books, or whether by watching the failures in the industry in your own particular branch of it. It is all a matter of observation and then analysis. Align the things up right, draw the logical conclusion and act. A man will often make a success where he has keenness of observation and keen analysis, even if he does not possess character, but the success is temporary.

A man who has character but not intellect never even makes a success. His job is to work for someone else. There is no easy road to success. The City of Success lies on top of a hill, not in the easy valley. You do not start at the top of the hill and come down, but you start in the valley and fight your way up the mountain, on the top of which is success, and to win success you must possess character and ability.

Must Keep Promises.

What is the weakness today in the merchandising field What is the thing that holds back co-operation of the jobber and the manufacturer from the contractor-dealer more than any one thing It is the feeling that you cannot trust him to do as he says. He has to possess character and intellect if he does not want to be fooled and be led into doing something wrong, or into a field that looks very attractive, and as a matter of fact is not.

I do not believe any man here, or any man in the world probably can imagine what the future of this business is going to be. I think it is the greatest mercantile business in the world. We have seen it completely changed several times in twenty years. We want to attract to this line of business the best brains we can, because we need them. There are thousands and thousands of good workmen needed today. There are thousands and thousands of good clerks needed today. There are thousands of new merchants needed today. And by the time they are established, there are going to be other thousands needed!

Now let us remember that there are specialized fields of endeavor in the contracting business that, to the man of aptitude in that direction, are safer to follow, better to follow, and will insure him surer and greater returns than other fields. Let us co-operate to establish in each of our communities the genesis with which to serve this new business that has been created as sound, constructive work.

The Brazilian Traction Light and Power Co., Ltd., have declared a quarterly dividend of 1½% on the cumulative preference shares of the company, payable on the 1st of October.

Salesmanship at the Fair

As Seen by One who was Looking for Information With a View to Purchase

To-day, when salesmanship plays such an important part in merchandising, it is essential that employers give considerable attention to this phase of their business. There is still room for a great deal of improvement and educational work among retail sales staffs and demonstrators. The need was apparent to the trained observed at the Canadian National Exhibition, among the electrical exhibits. True, there was no lack of courtesy and attention, for nowhere were those qualities more in evidence than among the attendants at the electrical booths; in fact, that is partly where the weakness lay; it was in some cases overdone, it was strained, and consequently went beyond the mark. For example, the writer heard two demonstrations of the same washing machine a few hours apart. Number one demonstration was a failure, while number two was a success. Now, what made the difference Both demonstrators were intelligent men, and both were equally conscientious and anxious to sell, yet number one left his hearers cold and unresponsive, nay, even a little critical, while the other made them feel that the machine was all he claimed it to be and more, and yet number one worked twice as hard, and possibly said three or four times as much as number two. That was it! He overdid it! He did not give the machine a chance to sell itself. He talked so much about its good qualities that he made one suspicious of weaknesses in its construction. It is always well for the salesman or demonstrator to remember that if the product they represent is a first-class one, that it won't take much talking to convince the prospective buyer of its merits. That was just where number two succeeded. He knew that true value does not need much advertising, beyond a brief description of its merits. He merely stated the facts in a quiet, dignified and impressive manner, speaking slowly and deliberately so as to give his hearers time to think about what he said, busying himself meantime in putting the machine through its various motions, with the result that when he had finished, there were more inquiries forthcoming, whereas in the case of number one it was noticeable that the people left almost in a body, without asking a question. They were dazed with the avalanche of words that had been hurled at them. Another mistake that number one made—and one that must always prove fatal in making a sale—was that he referred slightingly to the other man's machine, in his anxiety to prove his own superior. This is a grave mistake, and one that should be checked by employers immediately they discover the tendency in any member of their sales staff. It is a poor product that cannot stand competition.

At another booth where washing machines were being demonstrated, a salesman was asked by a lady for a pamphlet. Instead of giving it to her, he asked if he could not send it, as it would save her carrying it about. The question was quite all right, and suggested thoughtfulness, but when the lady stated that she wished to take it with her he again asked the same question, giving the same reason. Again the lady objected and again the salesman repeated the same question, to the lady's evident embarrassment and annoyance. It was, of course, quite evident that the real motive behind the question was to secure the address of the prospect, the result being that the first effect was spoiled. I consider this to be very bad tactics. If the address of a prospect can only be obtained by forcing a breach in his or her reserve, at the risk of embarrassed feelings, then it is not worth it.

At another booth at which I chanced to stop for a moment, a young lady was demonstrating a well known and widely advertised washing machine. She was courteous, obliging, intelligent and neat of appearance, but there was just that something about the tone of her voice that one "feels" when one listens to a minister who "reads" his sermon." Once or twice there was just the slightest hesitancy, as though she had almost forgotten her "piece," and that hesitancy broke the personal connection between demonstrator and hearers and gave an unnatural "stagey" effect to the proceedings. These may be little things, but they are the little things that count.

It must not be thought from the foregoing that all or any of the demonstrators were failures. Far from it. These instances are simply mentioned for the benefit of those who wish to become real sales men and women, and for those employers who are interested in perfecting a real, live sales staff—which is the soul of any retail enterprise. There were many examples of real sales ability. At one booth demonstrating vacuum cleaners I was pleasantly impressed with the happy confidence and assurance of its demonstrating staff. Their whole bearing revealed to me that they themselves were "sold" on the product they represented. The salesman or saleswoman who is not "sold" on the product they handle will never have more than mediocre sales ability. A certain young woman demonstrator at a booth exhibiting washing machines, when asked why she was so enthusiastic about the machine, promptly replied that she had washed with it herself, and knew its real worth. She was "sold" on her product, and her whole attitude reflected the fact, giving her an air of assurance and confidence that passed itself on to her hearers, and consequently helped to "clinch" sales. It is the axiom of a certain very successful salesman that personality is composed of courage, courtesy and kindness. We must have the courage of our convictions; we must state them courteously and above all things be kind in our bearing towards the prospect, remembering that he is human, and being human he has his own opinions, which are slow to change, but which will respond more readily to kindly, helpful service than to argument.

A Standard Plug—What the N.E.L.A. Think of it

Interchangeable Plugs Recommended Until Something Better is Found

At the Pasadena convention of the N. E. L. A. the subject of standard plugs and receptacles was discussed. The Wiring Committee reported at length, including the following extracts:

Standardization of Appliance Plugs and Housings (i.e., The Connection of the Portable Cord to the Appliance).

The importance of standardization of this item is being increasingly recognized.

There are two reasons why comparatively little progress has been made. The first is the genuine doubt as to the best standard, since both flat prongs and round prongs have distinct advantages and disadvantages, and further there is still a question as to whether there should be different types, one heavy and rugged for such articles as flat irons, and another type non-interchangeable with the first for light articles like heating pads, percolators, etc. The other reason for the delay is the disinclination of each manufacturer to adopt a standard other than his own.

At one time one manufacturer offered to contribute to a pool to be used to compensate manufacturers who would be put to undue expense if they gave up their own standards in order to fit into a general scheme. This method is probably unavailable just now but may be worthy of consideration later.

As reported last year, the consolidation of three of the important companies has led to standardization of the output of their different factories.

Practically all the manufacturers recognize the importance of standardization and are working, or at least thinking and planning, towards that end, and through the Appliance Group of the Associated Manufacturers of Electrical Supplies have a committee at work.

In the meantime, the existence of certain interchangeable plugs offers a stepping-stone or waiting place before standardization is attained. Of these interchangeable plugs one is known as the "Fitzall," another as the "T. & W. Universal," and there are or undoubtedly will be others.

The committee has had reports from its various members as to commercial experiences with these plugs and, while they are not perfect, in that they give trouble occasionally—which is true of many of the other plugs that are not interchangeable—the reports of the Committee indicate that it would be well worth while to give these interchangeable plugs a thorough trial.

There is no question of course that a plug designed to fit a special set of dimensions will be more apt to give good service on the prongs for which it is designed than an interchangeable plug which is designed to cover several different types of prongs. On the other hand, thert are many cases where our customers will prefer a cord and plug which will fit several appliances, even if it does not give perfect service, rather than have the nuisance of keeping on hand a separate cord or plug for each appliance, together with additional cords and plugs for spares.

It is clear that there is at least a temporary field for these interchangeable plugs, and though the field may be temporary, the use of these inter-changeable plugs, even if they do not give perfect service, will be a convenience to many of our customers and will be a direct incentive to the manufacturers to standardize on something better.

While interchangeable plugs are probably in their present state not a completely satisfactory solution, we recommend that member companies experiment with them until something better shall have been developed.

New Bureau Formed to Study Merchandising Conditions

The growth in the use of electrical appliances for household purposes has created a demand of large volume for certain electrical products, and has brought these products close to the general buying public. Electrical goods have now become merchandise, and the jobber, the contractor and the dealer, particularly the dealer, have taken on a new large and growing importance.

In order to obtain maximum advantage from these changed conditions, the Westinghouse Electric & Manufacturing Company, the Westinghouse Lamp Company, and some of the companies affiliated with the Westinghouse company have joined in the formation of the Westinghouse Merchandising Bureau. The purpose of the bureau is primarily to make special studies of the problems of marketing electrical merchandise and to suggest plans which should result in securing the maximum benefits for all distribution of electrical merchandise. A special study will be made of the various National electrical associations that are in any way connected with merchandising work, such as the National Electrical Supply Jobbers' Association, the National Association of Electrical Contractors and Dealers, the Commercial Section of the National Electric Light Association, Society for Electrical Development, and others. The bureau will endeavor to keep in touch with the local branches and sections of these organizations and act as a clearing house of information between the various sales offices and in regard to meetings, presentations of papers, speakers and similar activities. The bureau will also devise ways and means of displaying and exploiting electrical merchandise by means of demonstrations and other methods. The headquarters of the bureau will be at 165 Broadway, New York city.

M. C. Morrow, formerly resale assistant to the manager of the supply department of the Westinghouse Company, has been appointed manager of the bureau. M. C. Turpin, formerly assistant to the manager of the publicity department of the Westinghouse Electric & Manufacturing Company, will have charge of the publicity work of the bureau under the direction of the manager. Samuel Adams Chase, special representative of the supply department of the Westinghouse Electric & Manufacturing Company, while not directly connected with the bureau, will have his headquarters in the offices of the bureau in New York city, and will continue his work in the field of electrical association work in connection with the bureau.

Cutting the Cost of Installation

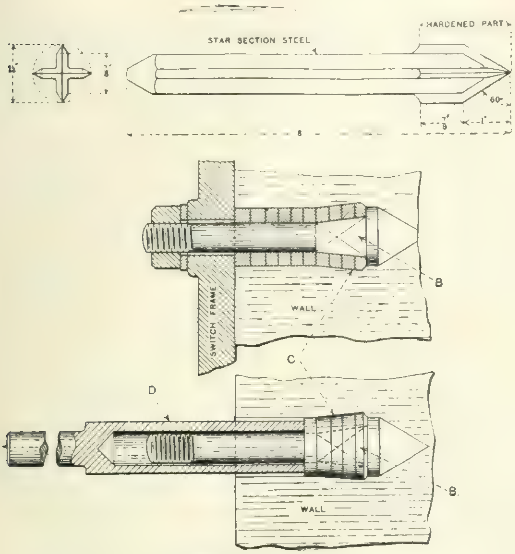
J. T. Towlson, in Electrical Review, Passes Along a Practical Idea

In the following article it is by no means the writer's wish to give offence to anyone, but only to state a fact, and to offer something sincerely believed to have some little value. If, however, while stating the fact, and adversely criticising the wasteful methods frequently adopted when it is required to firmly fix a frame, a switch, or any similarly formed piece of mechanical equipment, the orthodox methods are spoken ill of, it can be no fault of the writer if such criticism touches some susceptibilities. We must forsake the time-wasting ways, traditional and revered though they be, if a better way comes along. It is reasonably believed that such is quite acceptable. I have worked with men for many years who hang frames on walls, and the way they do it, the time it takes, and the cost incurred in respect of such a simple piece of work, is, frequently, enough to make angels weep. I have tried, with only a little success, to get a better way adopted; the better way has been passed as good, acknowledged to be a distinct improvement, and they, the men who hang things on walls, have gone on in just their own sweet way—"As it was in the beginning," etc. I happen to be attached to a large electrical concern in London, and, of course, we hang a lot of things on walls; besides pictures.

To hang these things, we do not call the mason—as we use no cement, nor mortar—nor do we use the mason's lump hammer and lump of steel, wherewith to cut holes in the walls. We simply do better without these, as the wireman or the switch erector can do all the fixing necessary without the mason's help. The old way has had its day.

The plan to be proposed—of which the writer is, it is believed, the originator—is really good. We, in Silvertown, have found it so. What is the traditional way by which preparation is made to hang frames, etc., on walls of buildings? It is this way: The wireman runs his leads to the switch position; and, desirous that the switch-frame shall be fixed ere he runs his leads beyond it, he marks the holes for the frame on the wall by means of a wood template. He sends for the mason, and stands by and waits until he comes. He waits a long while sometimes, just by way of habit, and not with evil intent.

The mason arrives, with his mate (two men), and while the mason with his lump hammer and his stump of a chisel is hacking the holes in the wall, his mate may, or may not, be mixing up a bit of cement. When the holes have been chopped out and the walls sufficiently disintegrated, the carpenter is called in to block the holes with wood—yet sometimes the conditions are slightly improved—for the wireman sometimes does this, though he must not let the carpenter see him do it. Then, when the wood is grouted in the wall, it must, perforce, have time to set ere the switch is hung. So it is a case of "Leave it till the morning," and this is done. When the cement is set, the electrical man (or the carpenter) bores holes in the wood, and the wireman hangs the frame and screws in the square-head and coach-screws. A day's work for a little job.



A wall borer and plug

That is the case fairly stated, and it is believed that the time has come for these things to be done in a better manner.

The "Silvertown" plan is this:

The holes are cut cleanly by means of a four-point or four-edged chisel a, made from Messrs. Beardshaw's star-section conqueror steel. After each blow with a hammer, the chisel is turned 45 deg. just as is an Ingersoll rock-drill when used for tunnel boring.

Lead washers, C, sawn from common lead pipe, are driven over the bolt shank or neck, and hard into the hole, by means of the hollow drift D. The hole is filled hard with these washers, quite to the wall face as shown, and as they are driven tightly home, over the enlarging neck of the bolt, they push their way, by expansion, into the brickwork, as shown. The square neck prevents the bolt turning. It is altogether a firm and permanent fixing. There is nothing now to do but to hang the switch and to tighten up the nuts. The bolts cannot draw out, and they cannot turn. I have hung a half ton on one ½-in. bolt, and that was just a year ago.

Canadian Committee Studying Industrial Hygiene

Employers large and small will be interested in the following statement:

"It is now a little over a year since the Canadian Government, stimulated by the example of England, France and the United States, instituted a committee to consider Industrial Hygiene in Canada. The committee, which is known as the Committee on Industrial Fatigue, and is under the Honorary Advisory Council for Scientific and Industrial Research, is under the chairmanship of Professor J. J. R. Macleod, of the Department of Physiology, University of Toronto. It includes Dr. A. B. Macallum, of the Honorary Advisory Council, members of the departments of physiology or psychology of the various Canadian Universities, and one representative each of the Department of Labor, Ottawa, of Industry, and of Women's organizations.

"The Committee believe that if the central problem of industrial hygiene, namely, maximum output, together with maximum health of workers, is to be solved, it can only be by discovery and application of the laws which govern the human body. It is their purpose to act as a channel of communication through which the knowledge and experience of medical science as it bears on industrial health and efficiency may be made available for all industry. Its functions are purely advisory and investigatory, and among its main objects are the following:—

"1. To offer manufacturers the assistance of scientific laboratories in solving the health problems presented by particular processes in their plants.

"2. To offer all interested the use of the Committee's intelligence bureau and library, where the most up-to-date information on general and specific problems of industrial hygiene is kept.

"3. To co-operate in investigations into conditions in different industries; into the incidence and causes of sickness, whether occupational or general, and into the actual relation existing between hours of work, working environment, etc., and production.

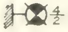
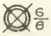
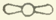
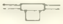
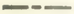
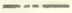
"With regard to this last point, an investigation is at present being made into the proportion of lost time in certain Toronto industries directly due to sickness. Arrangements have also been completed for investigations on somewhat similar lines to be conducted in Montreal, and others are in contemplation elsewhere.

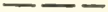
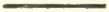
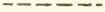
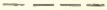
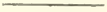
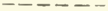
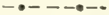
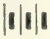
"As the work develops it is hoped to set up offices in different industrial centres in Canada. Up to date only two have been established; one in the Medical Building of the University of Toronto, where the library on industrial hygiene referred to above is situated, and one in Montreal, care of Professor E. G. Asselin, University of Montreal. A catalogue of the Committee's library will be supplied free on priority of application.

"Enquiries, whether on the work of the Committee, on general problems of industrial hygiene, or on matters of detail, will be welcomed and should be addressed to Miss R. M. Hutton, secretary, Committee on Industrial Fatigue, care of the Medical Building, University of Toronto. The committee will also be glad to consider requests for co-operation in solving any problem calling for practical experiment or scientific investigation. Such requests should also be addressed to the secretary.

"The Committee acknowledges, with thanks, ready co-operation received from Government Departments and other associations, including the Ontario Safety League, and also from numerous firms who have permitted investigations to be made in their works."

Are You Making Use of These Symbols and Urging Your Architects to do the Same?

	Ceiling outlet; electric only. No. in center indicates No. of standard 50 watt electric lamps	
	4/2 indicates 200 watt electric light capacity and 2 gas burners	
	Bracket outlet; electric only. Numeral in center indicates No. 50 watt electric lamps	
	Bracket outlet; combination 4/2 indicates 200 watt electric light capacity and 2 gas burners	
	Wall or baseboard receptacle outlet. Numeral in center indicates No. of stand. 50 watt electric lamps	
	Floor outlet: Numeral in center indicates number of 50 watt electric lamps.	
	Outlet for outdoor standard or pedestal; electric only. Numeral indicates No. of 50 watt electric lamps	
	Outlet for outdoor standard or pedestal: Combination 6/6 indicates 300 watt electric light capacity lamps, 6 gas burners	
	Special outlet for lighting, heating or power current as described in specifications	
	Drop cord outlet	
	One light outlet for lamp receptacle	
	Arc lamp outlet	
	Ceiling fan outlet	
	S. P. switch outlet. . .	Show as many symbols as there are switches, or in case of a very large group of switches indicate the No. of switches by a Roman numeral thus: S^1 XII means 12 single pole switches. Describe type of switch in specifications, that is flush or surface, push button or snap.
	D. P. switch outlet.	
	3-way switch outlet.	
	Automatic door switch outlet	
	Electrolier Switch Outlet	
	Meter outlet	
	Distribution panel	
	Junction or pull box	
	Motor outlet: Numeral in center indicates horse power	
	Motor control outlet	
	Transformer	
	Circuit for clock, telephone, bell or other service run under floor concealed. Kind of service wanted ascertained by symbol to which line connects	
	Circuit for clock, telephone, bell or other service run under floor above, concealed. Kind of service wanted ascertained by symbol to which line connects	

	Main or feeder run under floor concealed
	Main or feeder run concealed under floor above
	Main or feeder run exposed
	Branch circuit run concealed under floor
	Branch circuit run concealed under floor above
	Branch circuit run exposed
	Pole line
	Riser
	Telephone outlet; Private service
	Telephone outlet; Public service
	Bell outlet
	Buzzer outlet
	Push button outlet; Numeral indicates No. of pushes
	Annunciator; Numeral indicates No. of points
	Speaking tube
	Watchman clock outlet
	Watchman station outlet
	Master time clock outlet
	Secondary time clock outlet
	Door opener
	Special outlet; signal system as described in specifications
	Battery outlet

NOTE: If other than standard 50 watt electric lamps capacity is desired specifications should describe capacity of lamp desired

SUGGESTIONS IN CONNECTION WITH STANDARD SYMBOLS FOR WIRING PLANS

It is important that ample space be allowed for the installation of mains, feeders, branches and distribution panels.

It is desirable that a key to the symbols used accompany all plans.

If mains, feeders, branches and distribution panels are shown on the plans it is desirable that they be designated by letters or numbers.

Heights of center of wall outlets from floor (unless otherwise specified)

Living rooms	5′-6″
Chambers	5′-0″
Offices	6′-0″
Corridors	6′-3″

Heights of Switches (unless otherwise specified) 4′-0″

Electrical Co-operative Association Formed in British Columbia

To develop the Industry by Closer Co-operation, Helping the Contractor-Dealer and Generally Promoting Electrical Development

Under the heading "The Spread of the Co-operative Idea" the Journal of Electricity prints the following items regarding the recent formation of an Electrical Co-operative Association in Vancouver:

For the purpose of promoting electrical development and the more extensive sale and use of electrical appliances, the British Columbia Electrical Co-operative Association has been formed at Vancouver, B. C. Preliminary meetings have been held of the leaders of the movement and a general rally of all the men in the industry around Vancouver has been called for a date early in September.

The president of the association is George Kidd, general manager of the British Columbia Electric Railway Company, and its vice-presidents are R. F. Hayward, general manager of the Western Power Company of Canada, W. G. Murrin, assistant general manager, British Columbia Electric Railway Company, and William McNeill, assistant general manager, Western Power Company.

There is also an advisory council composed of E. E. Walker, sales engineer, British Columbia Electric Railway Company; E. Brettell, president of the British Columbia Association of Electrical Dealers and Contractors; J. R. Read, local manager, Canadian Westinghouse Company; H. Pim, local manager, Canadian General Electric Company; J. F. Little, local manager, Northern Electric Company; James Lightbody, publicity manager, British Columbia Electric Railway Company; W. W. Fraser, Electrical contractor; S. E. Jarvis, Jarvis Electric Company; F. T. Cope, F. T. Cope and Son, and E. B. Horsman, Horsman & Company.

Of the advisory council E. E. Walker is chairman, E. Brettell vice-chairman, and James Lightbody honorary secretary-treasurer.

The association has been framed after the plan of the California Co-operative Campaign. The objects as set out in the constitution are:

(a) To develop the electrical industry by educational methods, encouraging the practice of good ethical business methods and of improved service to the public.

(b) To develop a closer co-operation and understanding between central stations, contractor-dealers, manufacturers and jobbers, to the end that the efficiency of the various branches of the industry serving the public may be increased and that the customer may obtain better electrical service.

(c) To help the contractor-dealers improve their business methods, including accounting, sales advertising and general store appearance, thereby elevating the plane of the retail branch of the industry.

(6) To form a recognized body to promote electrical development in British Columbia, to support each branch of the industry when occasion requires and obtain fair treatment for invested capital on the part of the authorities by working for a fair attitude towards electrical development on the part of the public at large.

At a preliminary dinner given by George Kidd to the officers and members of the advisory council figures were produced to show that only a fraction of the business in electrical goods was being done that ought to be done on a basis of population. It was estimated that sales of electrical household devices alone amounted to only $200,000 a year, whereas on the basis of population they ought to amount to $427,000. Similar increases should take place in sales of other electrical goods, it was pointed out.

Owing to the limited territory it is not thought possible

Organized vs. Un-organized Effort

A little exaggerated, perhaps, but founded on a basic fact that you can't get the best results except by "pulling together." It's the same in the electrical industry as elsewhere.

[illegible]

to engage paid experts at present and the advisory council proposes to use volunteer help from the larger companies operating in the district. It is hoped to take up the following definite lines: accounting, advertising, store and window display, proper merchandising, standard estimating, installation of more outlets, etc. Work will be done among the dealers, contractors and architects. The council will also urge manufacturers and jobbers to assist the dealers by the furnishing of advertising material and sales helps, and will urge the dealers to use such material.

While the beneficial effects will be felt largely by the electrical dealers and contractors, the manufacturers and the jobbers in increased sales, it is believed that the formation of the association will help the central stations to obtain fair treatment. With public prejudice operating against large central stations, it is probable that people will pay more attention to suggestions from business interests such as the electrical industry. At the same time, the tying-in of small electrical contractors and dealers with large central stations is expected to help their credit, give them better standing and improve the whole tone of the electrical business.

YOUR WINDOW IS THE MAGNET OF YOUR TRADE

As evidence of good window dressing, we have the assurance of a well known contractor-dealer of this province that his income from store sales has been greatly increased, first in 1919 over 1918, and now during the first eight months of 1920 over a similar period of 1919. He can account for this in no other way than that he has been putting more time on his window; it is more attractive, more educational and his displays are more logically arranged.

As a matter of fact the figures shown by this contractor-dealer indicate that he is now practically doubling his sales annually. During the year 1919 his total sales were 196% greater than the sales of 1918. Similarly for the first eight months of 1920 his sales were 203% over the total for the same period in 1919.

This is evidence, apparently unmistakable, of the fine dividends that may be received from the investment of a little extra time in the electrical dealer's window display.

Rousing Convention of Hoover Boosters

A convention of the members of the sales organization of The Hoover Suction Sweeper Company of Canada, Limited, in Ontario and in the city of Montreal, Que., was held at the Royal Connaught Hotel, Hamilton, Ont., on Friday, August 20th, 1920.

The morning session included a sales talk by Mr. E. C. Marine, manager of the Hoover Sales School at North Canton, and a talk regarding production by production manager R. F. Judisch. Following the luncheon, talks were given by Mr. H. W. Hoover, the general manager of the company at North Canton, and Mr. R. C. Mower, advertising manager of the company at Chicago. At 4 o'clock the delegates were taken to the company's factory for the remainder of the afternoon.

At 6.30 a dinner was given at the Royal Connaught Hotel, followed by short talks by Mr. F. G. Hoover, associate general manager of the company, at North Canton, and Mr. Geo. S. Kerr and Mr. W. H. Cooper, two leading citizens of Hamilton. Mr. Thomas F. Kelly, the sales manager of the company, presided at all the meetings.

The Quebec Railway, Light, Heat and Power Co. have, according to a report which the auditors will shortly present to the shareholders, improved their financial position during the past year. The deficit this year will be approximately $20,000 as against $65,000 shown for the previous year. This is the more encouraging, in view of the fact that $60,000 had to be laid aside during the year to meet a suit before the Privy Council, a legacy of former years.

Hoover Boosters—Standing, left to right: R. W. Murray, salesman, Stratford, Ont.; A. W. Abbott, salesman, Kitchener and Waterloo, Ont.; W. D. [illegible], salesman, Brantford and Paris, Ont.; J. Skelton, district manager, Toronto, Ont.; S. M. Philpott, salesman, Hamilton, Ont.; S. G. [illegible], salesman, St. Catharines, Ont.; E. C. Marine, manager Hoover Sales School, North Canton, O.; E. E. Parsons, salesman, St. Thomas and Woodstock, Ont.; Geo. T. White, district manager, Windsor, Ont.; C. H. Whitelock, district manager, St. John, N.B.; F. G. Hoover, associate general manager, North Canton, O.; H. M. Potticary, district manager, Montreal, Que.; W. N. Hooke, salesman, Ottawa, Ont.; Elmore Philpott, district manager, Hamilton, Ont.; R. N. E. Connor, salesman, Toronto, Ont.; C. R. Robinson, salesman, Toronto, Ont.; H. W. Hoover, general manager, North Canton, O.; R. C. Mower, advertising manager, Chicago, Ill.; E. G. Blair, salesman, London, Ont.; J. L. Quigley, salesman, Toronto, Ont.; W. A. Barclay, salesman, Hamilton, Ont.; E. S. Wilson, Peterboro, Ont.

Front row, left to right: C. C. Swain, Windsor, Ont.; Roy Booth, general manager Robbins & Myers, Brantford, Ont.; W. G. Vogt, office manager, Hamilton, Ont.; R. F. Judisch, production manager, Hamilton, Ont.; Frank Ritz, salesman, Toronto, Ont.; A. P. Reed, district manager, Ottawa, Ont.; Thomas F. Kelly, sales manager, Hamilton, Ont.; C. E. Lillie, salesman, Toronto, Ont.; H. C. Elschner, salesman, London, Ont.; Gordon F. Brown, salesman, Sarnia and Chatham, Ont.; R. H. Sparks, salesman, Belleville, Ont.

There Are Various Ways of Getting Desirable Customers Into Your Store —One Way is to Hold a Flower Show

The London Hydro Electric System recently put on a Flower Show in their basement where they have their merchandising display. To reach the show it was necessary to pass by a varied stock of electrical appliances. This brought many desirable customers into contact with the Hydro salesmen.

Quick work by the London Hydro Department.—These machines were received at 8 p.m. and were all uncrated and delivered to the homes by 6 p.m. the same afternoon—an average of one machine every 10 minutes

OVE

What Is New In Electrical Equipment

"Miss Simplicity"

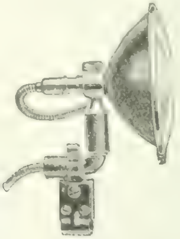
"Miss Simplicity" is the appropriate name given to the washing machine manufactured by the W. A. Kribs Co., Ltd., of Hespeler. This firm are now giving active assistance to contractor dealers in placing these machines in the homes throughout Canada. As its name implies, simplicity of construction and operation is one of the main features. As pointed out in their publicity campaign, this machine relieves the housewife from the back-aching drudgery of the scrub board, and gives her time for other duties while the wash work is going on. Miss Simplicity means cleaner clothes, more leisure time and happier, pleasanter homes. It is also pointed out that this machine sells at an attractive price.

The Eden Washing Machine

The Eden washing machine, which is suggestive of ideal conditions in the home, has a number of special features. One of these, which it is believed is not found in any other machine, is what is known as the "sediment zone." This is a little channel of quiet water which all dirt and sediment as it is removed from the clothes gradually settles into. In this way the movement of the clothing is always through clean water, and dirt once removed is not again forced through the fabric. The washing cylinder of the Eden is perforated with some six thousand holes through which the water rushes back and forth, flushing out dirt from every piece of fabric within the cylinder. Smooth wooden shelves inside the cylinder handle the clothes with the same gentle motion which is used by a housewife in dipping her finest laces. It is claimed that not a thread, however fragile, can be broken in the Eden. Another feature is that when the action of the washer ceases the door of the cylinder automatically stops at the top. When opened it folds back against the sides of the tub like a closed gate and prevents anything from falling down between the cylinder and the tub. The wringer is of the swinging type, can be locked in five different positions, and is provided with a safety release which throws the rollers apart when too great a bulk is passed through them. The Gillespie Eden Corporation, which has its Toronto office at 23 Scott Street, is advertising the merits of this machine widely to educate the public to its advantages and superiorities. Double page advertisements are appearing in many popular magazines, all of which goes a long way toward making it easier for the retailer to successfully close with his customer.

Light-weight Spotlight for Automobiles

A spotlight of light-weight design has been placed on the market by the Howe Lamp & Manufacturing Co., Chicago. The control of the lamp is flexible. It is designed to hold firmly in any position in which it is placed. A spring tension for the swivel joints automatically compensates for wear and also guards against stiffness which otherwise might result from exposure. The connecting wires are protected by a waterproof conduit, and the turn button switch is also of waterproof construction. The lamp is made of brass, with the exception of the bracket and clamp. The parabolic reflector, the conduit and other fittings are all finished in triple nickel plate. A 4-in. rear view mirror can be attached if desired.

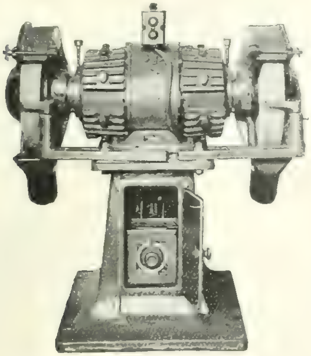


At the inaugural meeting of the new Transportation Commission recently appointed by the Toronto City Council to operate the Toronto Railway system when it is taken over by the city, according to franchise, in Sept., 1921, Mr. P. W. Ellis was chosen chairman, and Mr. E. M. Ashworth, secretary pro tem. The other two commissioners are Mr. Geo. Wright and Mr. Fred R. Miller.

The Crouse-Hinds Company of Canada are distributing a bulletin, well illustrated, entitled "The L. H. Headlight Switch Condulet."

Self-Contained Motor Driven Tool Grinder

Ease of starting and total enclosure of motor and control apparatus are the features of the motor driven tool grinder just placed upon the market by the U. S. Tool Company of Cincinnati, Ohio. The grinder shown is equipped with a 5 h.p. direct-current shunt-wound adjustable speed 1120 to 1600 rpm. 230-volt Westinghouse motor, started or stopped from a push button on the top of the motor frame. This push button actuates a type C Westinghouse starter with a speed adjusting rheostat all of which are located in the bottom of the machine frame. The reason for mounting the push button on the top of the motor frame is interesting. On previous machines of about the same type, these push button stations were mounted directly in front of the motor frame, but it was found that the workmen in using these grinders would start the motor by jabbing the button with the material which they intended to grind. With the new position for the buttons it is easier for the workmen to operate it with his hand than with the tool, which naturally prevents misuse.



Motor and control apparatus totally enclosed

Tumbler Switch for Household Use

The switch illustrated has been developed by the General Electric Co., and has for special features a rugged construction, and compact and quick reliable operation. The switch is intended for use on vacuum cleaners, washing machines and other household appliances. It has a heavy nickel covering, a porcelain base, and handle of strong composition material. The construction is of such strength as to permit the switch to be operated by foot if necessary, which is facilitated by the knurled surface of the knob which prevents slipping off the foot. The switch is rated at 5 amps, 250 volts and 5 amps, 125 volts.

Electrically Driven Fruit Juice Extractor

For extracting juice from fruits such as oranges and lemons, an electric motor-driven fruit-juice extracter has been placed upon the market by the Standard Supply & Equipment Company, Philadelphia, for use at soda fountains, lunch counters, etc. This device as shown in the illustration is well-finished to match the fittings of fountains. The bowl is made of cast-iron painted with white enamel. The motor is mounted vertically in the lower section of the extracter with the shaft extending upright to the upper bowl upon which is placed a cone-shaped scraper. On this scraper the fruit is pressed, which action causes the insides to be reamed out very rapidly. The motor can be operated on either direct or alternating current and is connected to a source af energy through a cord and socket plug.

A Concrete Guard Rail

The illustration shows a concrete guard rail used to separate the railway tracks of an electric suburban system in the United States from the highway. Where radials run along the side of a highway there is always a considerable element of danger to motorists who may, through accident or error in judgment, [illegible]

Concrete guard rail separating railway tracks from highway

Current News and Notes

Cardigan, P. E. I.

Mr. W. P. Doull, cor. Weymouth and Richmond Sts., Charlottetown, has been awarded the contract for electrical work on $40,000 residence being built at Cardigan by Mrs. J. P. McNechell.

Cochrane, Ont.

Messrs. Reed Bros., Cochrane, have been awarded the contract for electrical work on $7,000 hospital annex being built on 9th Ave., Cochrane, by the Hospital Board.

East London, Ont.

The Commercial Electric Co., 467 Richmond St., London, have been awarded the contract for electrical work on office building being built in East London by the London and Petrolea Barrel Co.

Fraserville, Que.

Mr. Fortunat Gingras, 34 St. Augustin St., Quebec, has been awarded the contract for electrical work on $175,000 "St. Joseph" hospital being built at Fraserville.

Halifax, N. S.

Messrs. Arthur & Conn, Argyle St., Halifax, have been awarded the contract for electrical work on tuberculosis hospital being built on South Street by the city of Halifax.

Mr. W. S. Crace, Upper Water St., Halifax, has been awarded the contract for electrical work on the $12,000 apartments being built on Oakland Road by the Eastern Investment Co., Halifax.

Kapuskasing, Ont.

Excavating has begun on the $4,000,000 pulp and paper mill being built at Kapuskasing, Ont., 60 miles west of Cochrane, by the Spring Falls Pulp and Paper Co., of Bradford, Pa. Contract for electric wiring will be let.

Kitchener, Ont.

The application of the Waterloo-Wellington Railway, which connects Kitchener with Bridgeport, for the right to charge a ten cent fare between December 1st and March 1st has been granted. The traffic on the line falls off during that period, and it is necessary for the company to get the extra fare to finance the proposition of keeping Kitchener connected with Bridgeport during the winter .

London, Ont.

In spite of increased operating expenses, due largely to the raise in wages,, the London & Port Stanley Railway earned a net income for the year ending July 31st, 1920, of $23,185.91 in addition to setting aside $20,509.39 as a sinking fund. The net income last year amounted to $50,207.45, but nothing was set aside for the sinking fund.

Moncton, N. B.

Contract will be let for electrical work on hotel being built at Main and Highfield Streets at a cost of $100,000, by the Brunswick Hotel Co., Ltd. Architect, R. A. Frechette, Bonnacord St., Moncton, N. B.

Tenders will be received until Sept. 22nd, on electrical work for $25,000 vulcanibing plant being built on Mechanic St., Moncton, by Mr. W. W. Lodge, 600 Main St., Moncton, N. B.

Montreal, Que.

Mr. Wm. Grimstead, 70 Madison Ave., Montreal, who has been appointed general contractor on $51,000 factory being built on St. Elizabeth St., by Messrs. H. P. Labelle & Co., is calling for prices on all sub-trades.

The electrification of the Montreal harbor railway terminals is now well in hand, and it is stated by F. W. Gowie, chief engineer, of the port of Montreal, that about 42 miles of tracks will be in operation by next spring. The remaining sixteen miles will be electrified later.

The Union of Municipalities of the Province of Quebec, at a meeting held in Montreal, passed a resolution asking that the water powers of the province be developed by the Government instead of by private enterprise. The resolution also requested that the Government appoint a special commission to investigate the situation, on the ground that the progress of the province necessitated further development of tht water powers.

Ottawa, Ont.

Mr. H. L. Allan, 272 Bank Street, Ottawa, has been awarded the contract for electrical work on $100,000 hospital and childrens' home being built in Ottawa by the Salvation Army.

Mr. Leblanc, Hull, Que., has been awarded the contract for electrical work on $16,000 apartments being built on Waverly Street, Ottawa.

Mr. J. A. Ellacott, Bank and Strathcona Ave., has been awarded the contract for electrical work on $30,000 apartment being built on Gilmour St., Ottawa.

Port Arthur, Ont.

Seven cent cash fares went into effect on the lines of the Port Arthur and Fort William Street Railway on September 1st.

Renfrew, Ont.

At a recent meeting of the Renfrew Town Council it was decided to heat the new fire hall by electric heaters.

Regina, Sask.

Although voted down by the electors some weeks ago, the one-man electric car question is again being agitated in Regina, Sask., and the devotees of the system are planning to make the question an issue at the annual election for mayor and alderman, when it is expected a much larger vote will be polled.

Sherbrooke, Que.

The ratepayers of Sherbrooke, P. Q., have approved the borrowing of $60,000 for building a new dam and power house, in connection with the municipal power development.

Smooth Rock Falls, Ont.

Messrs. Reed & Son, Cochrane, Ont., have been awarded the contract for electrical work on mill and out buildings to cost approximately $500,000, being built at Smooth Rock Falls, by the Mattagami Pulp Mills Co.

St. Catharines, Ont.

Messrs. Bennett & Wright, 72 Queen St. East, Toronto, have been awarded the contract for electrical work on $200,000 college being built in St. Catharines by the Bishop Ridley College.

Stratford, Ont.

The Kindel Bed Co., Stratford, ,Ont., will let contract for electrical work on the $30,000 addition which they are building to their factory at Stratford.

Sturgeon Falls, Ont.

Contract will be let for electrical work on provincial

CADMIUM-COPPER WIRE

—THE WIRE FOR WEAR—

During the War the whole of our output of Cadmium-Copper Wire was taken by the European Governments for War purposes.

We are now once more in a position to supply the requirements of our customers for this well-known wire in all sizes for Trolley Wire, Transmission Lines, Telegraph Wire, &c.

CONDUCTIVITY 7% TO 10% LESS
TENSILE STRENGTH **10% TO 75% GREATER** } THAN HARD DRAWN COPPER
According to size of wire.

As an Asset Cadmium-Copper has the same Scrap Value as Electrolytic Copper.

TROLLEY WIRE

is manufactured by us in

ROUND,
GROOVED,
NON-FOULING,
SPECIAL SECTIONS

and has been supplied by us to the principal Street Railway Systems of the Dominion. The following Report was received by us from the Superintendent of one of the largest systems:—

> "On May 8th, 1919, we strung the outside curve with a sample of this wire. The opposite curve in the same direction had been strung with ordinary trolley wire a very short time previous.
>
> "On December 21st both curves were measured with a micrometer. This would give each curve 228 days' service, and taking 365 mils as the diameter of a 2/0 wire, we found that the maximum wear at any point on the cadmium wire was 20 mils, while the maximum wear at any one point on the ordinary copper wire was 60 mils. The average wear on the cadmium wire was 5 mils, and on the copper wire about 20 mils.
>
> "At the above rate of wear the cadmium curve should last **between two and three times longer** than the other curve."

SERVICE COUNTS

Eugene F. Phillips Electrical Works, Limited

ESTABLISHED 1889

Head Office and Factories - MONTREAL

[illegible] at Sturgeon Falls, Ont. Secretary, H. F. McNamara, [illegible] Bldg., Toronto.

Summerside, P. E. I.

Messrs. Thos. Johnson & Co., Water Street, Summerside, P.E.I., have been awarded the contract for electrical [illegible] to the Prince County Hospital.

Toronto, Ont.

Contract will be let for electrical work on $17,000 residence being built at Poplar Plains Road. Architect, Benjamin Brown, 313 Manning Chambers, Toronto.

The National Electric Co., 100 King West, have been awarded the contract for electrical work on $30,000 dental college being built at College and Huron Streets by the Royal College of Dental Surgeons.

Contract will be let for electrical work on $50,000 Congregational church being built at Dundas and Edna Streets by the Jeanne D'Arc Church congregation.

The Canada Electric Co., 175 King St. East, Toronto, have been awarded the contract for electrical work on $300,000 theatre being built in Montreal by Messrs. J. & J. Allen.

Messrs. Douglas Bros., 2137 Yonge Street, Toronto, have been awarded the contract for electrical work on $80,000 garage being built on Danforth Ave., by the Riverdale Garage, Ltd.

Mr. P. J. Dunn, 3150 Dundas West, ,has been awarded the contract for electrical work on $10,000 residence and garage being built on Quebec Ave. by S. B. Hatch, 61 Oakmount Road.

Welland, Ont.

The contract will be let shortly for electrical work on $50,000 factory being erected at Welland by the Jos. Stokes Rubber Co., of Trenton, N. J.

Say "Merry Christmas" Electrically

The Society for Electrical Development is launching its annual Electrical Christmas Campaign. The "dealer-helps" to be supplied during this year's drive will be an attractive eight-color window display cut-out. This display piece will feature the dominant idea or slogan of the campaign, "Say 'Merry Christmas' Electrically." Poster- stamps, attractive printed letters, advertising cuts and other selling helps will be supplied.

Chain Stores to Handle Electrical Goods

Plans have been worked out by the Winchester Repeating Arms Co., New Haven, Conn., for the operation of a chain of retail stores in various sections of the country. Electrical goods, such as heating appliances, washing machines, vacuum cleaners, flash-lamps, flatirons, etc., will be handled in addition to the Winchester and hardware lines at present carried in the several stores established.

"Sir Henry Morris, the economist, says that 52,110 more persons were employed in the coal-mining industry in 1919 than in 1913, and that with much more pay and fewer hours (which conditions are said to mean increased production) they raised 58,026,456 fewer tons of coal in 1919 than were raised in 1913."—(Democrat, London, England.)

When the weather suits you not,
Try smiling.
When your coffee isn't hot,
Try smiling.
When your neighbors don't do right,
When your relatives all fight,
Sure it's hard, but then you might
Try smiling.

Doesn't change the things, of course,
Just smiling.
But it cannot make them worse—
Just smiling.
And it seems to help your case,
Brightens up a gloomy place,
And it sorts o' rests your face—
Just smiling.
—Echange.

Trade Publications

The Square D Company, Walkerville, Ont., are distributing an attractive general catalogue, W40, describing steel enclosed industrial control switches, service entrance switches, motor starters, compensator type switches, plug receptacles, iron clad switches, meter protective trims, accessories, etc. The catalogue is well illustrated.

Personals

Mr. A. B. Cooper of the Canadian General Electric Co., and Mr. A. S. McCordick of the Canadian Moloney Electric Co., have issued a challenge to any two golf enthusiasts associated with the electrical industry in Toronto.

Mr. A. B. Zerby, who has been connected with the Department of Publicity of the Westinghouse Electric & Manufacturing Company for about nine years, has been promoted to assistant to manager of the department. Mr. Zerby graduated from the Pennsylvania State College in 1911 with the degree of Bachelor of Science in electrical engineering.

Mr. W. L. Goodwin is to pay a return visit to Montreal, in October, the exact date not being fixed at the time of writing. Full particulars of the date and programme will be announced in our October 1st issue. The arrangements are in the hands of an informal committee of electrical men, consisting of jobbers, contractor-dealers and manufacturers. Mr. M. K. Pike, of the Northern Electric Company, who was chairman of the executive committee on the occasion of Mr. Goodwin's former visit in February, is again taking an active part in the organization for the visit in October. Mr. Goodwin's campaign in the early part of the year resulted in the formation of a Contractor-Dealers' Association.

Mr. C. U. Peeling, formerly manager of the Cornwall Street Railway, Light and Power System, has been appointed superintendent of the Palmetto Power and Light Co., Florence, South Carolina.

The List Grows

The most recent official compilation of electric railway fare increases shows:

81 cities with a 10 cent fare
5 cities with a 9 cent fare
42 cities with an 8 cent fare
49 cities with a 7 cent fare
and a one cent transfer charge
190 cities with a 7 cent fare

W. E. K. Service News.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MacLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 296 Broadway
CHICAGO - - Room 803, 63 E. Adams St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, October 1, 1920 No. 19

Should Have More Detailed Statistics of Electrical Industry

Perhaps it is because the electrical industry is in its infancy, as yet, but, for whatever reason, it is a difficult matter to get anything in the way of statistics Government figures, for example, merely show imports and exports of "electrical appliances," and this term appears to include everything from a 50,000 kw. generator to a two volt. lamp. In consequence, therefore, of being unable to get any definite information on the extent to which the electrical merchandising field has been saturated, manufacturers, wholesalers and dealers alike are working very much in the dark. This is a pity, as it would certainly facilitate the sale of electric equipment of any kind if we were in a position to form any fair estimate of what part of the field had been covered, and to what extent the various sections of the country are saturated with this, that or the other appliance. Manufacurers and wholesalers no doubt have uniformly found this lack of information a great handicap.

The collection of this information presumably rests with the Statistical Department at Ottawa, but it is doubtful if they can be blamed for not having compiled the necessary data until the demand for it arose. So far as we know no united action has ever been taken to induce the government to prepare statistics in detail of our industry and, indeed, it is doubtful if many protests have been lodged by individuals. As we know the Statistical Department they are always pleased to have suggestions, and if it could be pointed out to them that the necessity for detailed information regarding the electrical industry would justify a considerable expenditure of money and time there is little doubt but that this information would be gathered in the near future.

We are informed that the Canadian trade, both import and export, is the subject of an annual conference with the Department of Customs, and the suggestion has been made that the electrical industry should be in a position to make some representation as to their requirements at the next conference. The suggestion appeals to us as a good one, and we are quite satisfied that if some united effort were made by the electrical industry to present to the Statistical Department in some detail an outline of our requirements the department would receive these representations very sympathetically. We offer the suggestion in the hope that it will set the members of the industry thinking and result in some united action.

The History and Practical Effects of Daylight Saving

The Illuminating Engineers Society transactions abstracts an interesting paper by Preston S. Millar on the subject of daylight saving. Mr. Millar's findings will be of interest in view of the arguments that have been advanced for and against daylight saving in Canada.

This paper deals with the advantages and disadvantages of "Daylight Saving," as experienced in the part of the United States lying north of the Potomac and Ohio Rivers and east of the Mississippi River. Statistics of outputs of electric and gas central stations are shown, indicating for different stations comparisons of total output and of hourly output on comparable days under daylight saving and under standard time. The general indications of reduction in output due to daylight saving are as follows:

Reduced electricity output, total systems during seven summer months	3 per cent.
Ditto—residential loads only	8 per cent.
Ditto—gas station, total output	3 per cent.

Estimates of the approximate savings in coal and in expenditure for light throughout the entire country during seven summer months under daylight saving are as follows. These of course are only approximate, being subject to very considerable error:

	Annual saving in coal	Annual Saving in expenditure for artificial light
Electricity (central stations)	300,000 tons	$14,000,000
Gas	195,000 tons	5,250,000
Totals	495,000 tons	$19,250,000

The paper traces the history of the daylight saving movement abroad and in this country, and then proceeds to sum up the results of the author's inquiries into the advantages and disadvantages of daylight saving. The advantages are shown to include more outdoor recreation for those who are in a position to avail themselves of the opportunities afforded by the additional evening hour of daylight, and saving in fuel and in expenditure for artificial light as shown above.

Advantages which have been alleged but which do not appear to be clearly proven are: increase in gardening where daylight saving assists the amateur gardener but impedes the professional gardener and benefits conferred upon the health of the public where the advantages of increased outdoor recreation for a part of the public appear to be more or less offset by the disadvantages of earlier retiring and rising in the case of the urban poor.

Disadvantages which have been clearly demonstrated are those under which farmers, dairymen, miners and perhaps other outdoor workers labor due to being compelled to start work one hour earlier in the morning or to lose time by reason of the fact that others quit work one hour earlier in the evening.

The author's deduction and opinions are in general that the 24 hours of the day have been distributed among work, recreation and sleep as a matter of evolution in which the comfort and convenience of the greatest number of people have been the only desideratum. In advancing activities during the summer by one hour, the well-to-do articulate part of suburban and urban communities and most of those in rural communities suffer disadvantages. It would seem more important to serve the interests of the latter and departure from standard time in the direction of daylight saving seems therefore inexpedient. Diversification of hours of industry serving the convenience of different classes of people seems more desirable than misadjusting the time in order to impose the wishes of one class of the population upon all.

An Electric Organization for Both Social and Commercial Activities

A quite attractive scheme of organization is being tried out by the electrical men of Cleveland. It is known as the Electrical League of Cleveland, and is under the direction of a Members' Council. The object of the league is to promote industrial, commercial and social welfare of its members; also to participate in activities for the improvement of the electrical business, and to be of service to the public. Briefly the Electrical League is a grouping together of the various clubs, organizations and associations that already exist, such as the Electrical Contractors' Association, the Residence Wiring Association, the Electrical Dealers' Association, the Lighting Fixture Dealers' Club, etc. The Members' Council of the Electrical League is composed of representatives of these various associations.

One of the first activities of the Cleveland Electrical League was to conduct a big development campaign with two objects in mind: first, to develop the men now engaged in the business, and make it possible for them to be of greater service to the public; and second, to enlighten the public on the subject of electricity, its uses, and wonderful advantages.

As outlined in their campaign programme, the objects of the Members' Council are the following:

Objects of the Members Council.

1. To conduct educational meetings for the improvement of the electrical business.
2. To bring together once each month all the members of separate clubs and associations into one big electrical family.
3. To create better acquaintanceship, closer relationship and greater understanding among men engaged in the electrical business.
4. To discourage prejudice, selfishness and petty jealousy.
5. To give the members an opportunity to acquaint themselves with the plans of each group, thus avoiding conflict and promoting co-operation.
6. To give members an opportunity for open discussion of the success or failure of certain projects.
7. To give members an opportunity to get together once each month with representatives of each group for the discussion of important subjects of common interest.
8. To perpetuate the friendly relations between contractors, dealers and Central Station company.
9. To acquaint members with the problems of each group.
10. To improve business methods.
11. To improve service.
12. To improve accounting systems.
13. To improve salesmanship.
14. To improve advertising.
15. To improve window displays.
16. To improve store arrangement.
17. To practice standard methods of estimating.
18. To encourage use of high quality material and workmanship.
19. To stimulate the sale of better fixtures.
20. To stimulate the sale of household devices.
21. To create a desire for electric service and not merely for wire and lamps.
22. To provide necessary outlets in all residence, commercial and industrial wiring installations.
23. To provide scientific illumination in all new installations, and to make necessary improvements on old installations.
24. To co-operate on standardization movements.
25. To more effectively carry to the public the message, "Do it electrically."

The success of the Electrical League's activities will depend almost entirely upon its success in bringing together representatives of all the various organizations into its Members Council so that the whole industry may be represented by one joint group. If that is accomplished further proposed activities include the following:

1. A story contest.
2. A school contest.
3. General publicity campaign.
4. Industrial lighting campaign.
6. A school for salesmen.

Regarding the general publicity, it is stated that the plan is to conduct a publicity campaign in the daily and weekly papers to enlighten the public concerning the wonderful advantages of electrical service in the home, store, office and factory. In the electrical business we have taken it for granted that the public have a greater knowledge of the subject than they actually possess..

Installation of 3,000 Kw. Full Automatic Rotary Converter

Automatic operation of large rotary-converter sub-stations is now a fact in the installation and operation of a 3,000 kw. station by the Cleveland Railway Company. This station which contains two 1500 kw. Westinghouse rotary-converters together with transforming, switching, metering and control equipment is the first of four stations to be installed which will take care of heavy traffic load outside of the main business section of the town.

In the past several years there have been several automatic sub-stations installed for use in small cities and for interurban lines. No one had attempted to adopt this apparatus for heavy city traffic because it was thought that several of the advantages gained by its use would not be had where substations had to be operated continuously a greater part of the twenty-four hours. Therefore, the installation of full-automatic equipment at Cleveland, the fifth city of the United States, is interesting because it shows the wide application of "laborless" equipment. The sub-station which was recently put in operation by the Cleveland company is also distinctive because of its being the largest station with the largest units ever installed whose operation is to be left entirely to automatic operation.

The advantage of this equipment over manually operated apparatus is both in the solving of the labor problem and in the better operation that will be obtained. After the main alternating-current circuit breakers are closed it only takes about 40 seconds for the entire cycle of operation to be finished so that the machine can immediately assume load.

Besides being designed to take care of varying conditions, precautions have been taken to meet all difficulties that can be foreseen. For this purpose there are eighteen protective relays, each one functioning as conditions for its use arises.

The difficulty of obtaining proper maintenance men sometimes encountered in the installation of automatic sub-station equipment was obviated by the Cleveland Railway Company in a manner that has proved most successful. When the stations were contemplated it was seen that several high-class men were desirable who would be well informed as to the lay-out of the station in order to properly find trouble and maintain the equipment. For this reason L. D. Bale, Engineer of Sub-stations, who has spent the past year and a half in the study of automatic operation, picked three likely men and initiated a school wherein he and the men studied very intensively, the complete working diagrams and schematic diagrams of the station. Questions were raised as to what would happen if a relay failed to operate or if certain conditions were present and the answers were obtained by actually working through the circuits. In addition, a separate wiring diagram was made for each piece of apparatus so that in case of trouble the exact cause could be located with the least difficulty and in the quickest possible manner.

The equipment for the four automatic sub-stations was designed by the engineers of the Westinghouse Electric & Manufacturing Company, working in close conjunction with the engineers of the Cleveland Railway Company.

The Electric Sterilization of Milk Offers Advantages Not Shown by Other Methods

A pamphlet has recently been issued by the Medical Research Committee of the National Health Insurance, England, describing experiments conducted by Professor J. Martin Beattie, Professor of Bacteriology of Liverpool University, and Mr. F. C. Lewis, Lecturer on Bacteriological Methods, on the electrical sterilization of milk. The report points out that pasteurization as carried out commercially is not an efficient method of ridding milk of B.coli and other organisms, as it is only when temperatures of about 180 F. are reached that anything like sterilization is obtained. Experiments indicate that bacteria left in pasteurized milk, especially if cooling following treatment is not very rapid, multiply very much more quickly in treated than in untreated milk. Regarding the electrical method, the report states that it is more efficient for ridding milk of bacteria than are the processes in general use at present. It is easy of application, the results are regular, and the risks of after-contamination are comparatively small if the rules of ordinary cleanliness are attended to. According to the report, milk which has been electrically treated and rapidly cooled can be kept at ordinary room temperature for several days without any appreciable change. On several occasions milk was kept in the laboratory for a week without any apparent effect, and in a few instances it remained perfectly sweet for a fortnight. In all cases it remained in perfect condition for two or three days.

The primary objects of the experiment were two fold, namely, to investigate the possibility of using electricity as a sterilizing agent, and if such action could be demonstrated, to devise suitable apparatus for the treatment of large volumes of milk. In the earlier experiments the effects of direct current on milk was observed, using various types of apparatus, but in no case could the result obtained be looked upon as satisfactory, and although bacterial destruction was apparent, chemical changes in the composition of the milk were always so pronounced that the use of direct current was finally abandoned. Similarly, no satisfactory results were obtained by experiments using high differences of potential with small current. The only satisfactory results were obtained with alternating current, where the effects were immediately so gratifying as to justify the experimenters in discarding every other method. Following trials with various types of apparatus it was finally decided that the best results were obtained where the milk could be treated in "flow," as in this way it was more easily possible to expose each part of the fluid to the same effect for the same length of time. The general plan of experiment finally followed, therefore, was to allow milk to flow continuously through the tube and make measurements on the velocity on the flow of milk, the terminal voltage, the amount of current used, the temperature of the milk at the outlet, and the bacteriological efficiency.

With the apparatus as designed by the Liverpool professors the above factors could be varied at will, which was all the more necessary as the specific resistance is not the same for all micro-organisms; also that this resistance varies in the same organisms according to the medium upon which it was grown. For this reason it is no guarantee of the destruction of the bacteria merely to pass an electrical current through milk. The current pressure must be sufficiently high to overcome the electrical resistance of the organism, and both voltage drop and current density must be constant within well defined limits. The general conclusion drawn from the experiments was that with tensinal voltages between 2,500 and 3,500, with a current of 0.5 to 0.6 amperes, a temperature of 59 degs. to 64 degs. C, and a time exposure of four minutes, all B.coli could be either destroyed or so altered as to completely inhibit their growth on artificial media.

Experiments were made later with milk rich in tuberculosis bacilli, with excellent results. It is considered that milk treated in this way undergoes no chemical change. On the subject of cooling the milk after treatment, it is considered that though not a method of destroying bacteria, rapid cooling should be resorted to to avoid the "favorable temperature period," and so prevent the rapid multiplication of any "residual" bacteria—the "keeping quality" of the milk is thereby improved. The final conclusions drawn from the experiments are that milk can be rendered free from B. coli and B. tuberculosis by this electrical method without raising the temperature above 63 or 64 degs. C. The temperature effect is short in duration, and is not the chief factor in the destruction of the organisms. Though the milk is not sterilized in the strict sense of the word, the percentage reduction of bacteria taken over a period of a fortnight is 99.93.

Ontario Division of C.M.A. Offers Suggestions Re Extra Power

The Ontario Division of the Canadian Manufacturers' Association recently issued a summary of the proceedings regarding the power situation in Ontairo since the annual meeting on April 29th. The summary outlines, (1) the resolutions of the Ontario Division at the annual meeting; (2) the position of the Hydro Commission as outlined by a deputation which presented these resolutions; (3) developments since the May conference, and (4) some present recommendations which run as follows:

1. That the Government be urged to investigate the following possible sources of power and to remove any obstacles there might be to their full development.

(a) 25,000 h,p, additional which the Toronto-Niagara Power Company are able to develop.

(b) 18,000 h.p. which the Toronto Niagara Co. are now exporting to the United States under contracts which expire in October, 1920.

(c) 30,000 h,p, by a steam plant now lying idle in Toronto.

2. That the Ontario Division do its utmost to secure the

acceptance by the Government of the principle that the power needs of industry should be satisfied before any new radial railway enterprises [illegible] large amounts of power are embarked on.

It is difficult for one who is not closely in touch with the whole situation to appreciate the difficulty in the way of following the recommendations suggested by the Canadian Manufacturers' Association. If the Toronto Niagara Power Co. has the machinery installed for developing 25,000 additional horse power the question naturally arises—why doesn't our local government take steps to force the company to develop this power and supply it to the Ontario Hydro Commission for distribution. The actual fact is, however, that the Toronto Niagara Power Co. were developing this power not very long ago in excess of their franchise rights, and an injunction was obtained to prevent them.

The other question that would naturally arise is that the steam plant in Toronto, which is capable of developing perhaps 25,000 h.p. at peak load is lying idle. Admittedly its operation would be more expensive, and there is the difficulty in getting coal, but as a peak load proposition for our factories and offices—industries in general—is held up, the matter of cost is not always the prime consideration .

Presumably it is not as easy as it looks on the surface to obtain this power for the Hydro Commission else it would have been obtained before the present time, but if any stone has been left unturned, we would urge on the Ontario Commission that the season is rapidly approaching when the power shortage will again hit our industries. Whether the conditions will be as bad or worse than last year it is impossible to say. There are those who believe that the general slowing up which is evidenced in certain quarters will reduce the demand for power, but on the other hand there is no evidence whatever as yet of a slackening in the demand. One thing only seems clear at the moment, namely, that some arrangement whereby the whole power situation in the Niagara district will be under the control of one group would be greatly to the advantage of the Province of Ontario. Everything possible should be done to remove the impression — the fact indeed—that Ontario is not a desirable place at the present time for new industries to locate or for established industries to consider expansion.

Canadian Marconi Absorbed by C.G.E.

The recent announcement of the affiliation of the Marconi Wireless Telegraph Co. of Canada, Ltd., with the Canadian General Electric Co., Ltd., marks an important step in the development of the electrical industry in Canada. By this merger the Marconi company comes entirely under Canadian control. Directors of the Canadian General Electric Co., Ltd., including the Hon. Frederic Nicholls, Sir William Mackenzie and A. E. Dyment, all of Toronto, have been elected to the new Marconi company board of directors, which now has the following members: Hon. Frederic Nicholls, president; G. Marconi, A. E. Dyment and Robert Bickerdike, vice-presidents; and the following directors: Sir William Mackenzie, Godfrey C. Isaacs, G. M. Bosworth, C. Greenshields, K.C., and A. H. Morse, managing director. The plans of the new company call for an increase in the capital stock to provide additional working capital and the acquisition of valuable wireless patents controlled by the Canadian General Electric Co. Among the patents involved are the Alexanderson alternator, the manufacture of the Fleming valve and the Alexanderson multiple aerial.

The Westinghouse Electric Mfg. Co., East Pittsburgh, Pa., announces a special stockholders' meeting to be held November 18th for the purpose of increasing the indebtedness of the company by the sum of thirty million dollars [illegible]

Quebec R. L. H. & P. Had Better Year

According to a preliminary report of the Quebec Railway, Light, Heat & Power Co. for the fiscal year ended June 30 last, there is a deficit as a result of operations of $44,703, as compared with a deficit of $65,273 in the report issued a year ago. Net earnings from from operation for the twelve months under review amounted to $602,471, a decrease of $30,634, insufficient by $44,703 to meet the requirements of fixed charges, taxes and depreciation of equipment placed out of service during the year. Gross earnings from operation amounted to $2,372,034, an increase of $294,413 over the previous year, a gain of slightly over 14 per cent. Costs of operation and maintenance rose $325,047 over the previous year.

Reporting to the shareholders, Mr. Lorne C. Webster, the president, states: "Extensive alterations and improvements of the intake and the installation of new steel head gates at the main dam on the Montmorency River were carried out during the year, the results of which, when completed, will prove most satisfactory in the operation of the power division. There was expended during the year on capital account an amount of $266,818, which amount includes the extension of the city street railway on Beauport road to the city limits, also the nine new double truck P. A. Y. E. cars."

Getting Ready for Future Activity

One of the largest electrical manufacturing Companies in the United States announces that it has received within the past three months orders from electrical power companies for over half a million horse power of turbine generators. These orders will go a long way towards improving the general economic situation. The country as a whole is short of power and in consequence industries of every kind—from manufacturing to housekeeping—have been seriously handicapped. Among the orders received were the following: one compound unit of 60,000 kw. (80,000 h.p.), one compound unit of 45,000 kw., and three compound units of 35,000 kw. each.

A Valuable Financial Publication

The Annual Financial Review for the year ending June, 1920, published by Houston's Standard Publications, Stock Exchange Bldg., 84 Bay Street, Toronto, has just made its appearance. This year it comprises over 750 pages of concise, valuable information regarding the financial success of Canada's basic industries. The review contains a carefully revised summary of facts regarding securities listed on the Montreal and Toronto stock exchanges, as well as other prominent Canadian companies. It includes the current annual statements of companies; the highest and lowest prices of stocks and bonds on each exchange for each month for ten years; the number of shares sold each month for the past fifteen years; rate of dividends paid for past years and other important items in the history of the different companies, such as the capital stock, particulars of franchises, description of securities, when bonds are redeemable, dividends payable, etc.

Every man owes it to himself to invest a certain proportion of his income, and no more accurate and reliable source of information regarding the past record of the variout Canadian securities is available than is contained in this Annual Financial Review. It is bound in an attractive cloth [illegible]

Telephone Pioneers of America Front row, left to right, B. P. Fitzpatrick, Gen. Solicitor, K J Dunstan, Division Manager, Toronto; R. F. Jones, Division Manager, Montreal; L B McFarlane, President, W H Winter, Gen Supt of plant, D. T. Rayside, Supt. of Construction, East

Pioneer Telephone Men Meet in Conference at Montreal—H. B. Thayer Elected to Office of President

Between five and six hundred telephone men of the United States and Canada attended the convention of the Telephone Pioneers of America, held at Montreal, September 10-11. This year's meeting was of unusual interest, owing to the fact that it is four years since the last one (at Atlanta, Ga.) was held. As is generally known, this association is unique, owing to the fact that all its members are men who have had over twenty-one years' experience in the telephone business.

The first day of the convention was given over to general business and addresses by leading telephone men. Mr. T. D. Lockwood, vice-president of the association and expert on telephone patents, occupied the chair. The delegates were formally welcomed by the Mayor of Montreal, Mr. Mederic Martin, after which the reports from the different committees were received. The secretary's report, which was especially gratifying, showed that between January 1920 and September 1920, two hundred and ninety-nine members had been enrolled.

The death last year of Mr. Theodore N. Vail, the first president, and a distinguished member of the Telephone Pioneers of America, called for the following motion of regret, which was moved by Mr. James Robb:—

"Born in Carrolton, Ohio, July 16th, 1845, Theodore Newton Vail had achieved national prominence when in 1878, he resigned as general superintendent of the United States Railway Mail Service to become a pioneer in the great task of making the newly invented telephone the instrument of a nation, and a blessing to the civilized world.

"As the first executive of the Bell System, he blazed a trail for us all to follow through the forest of difficulties which had to be overcome in the early years of telephone development.

"He was a typical pioneer, leading the way over unknown paths, cleaning out the underbrush of doubt and swamps of discouragement, until at the end of the trail he witnessed the realization of his early vision of a great nation-wide telephone system, serving all the people all the time, the continent spanned by the talking wire and the oceans traversed by the wireless speech.

"It has been well said—

'We live in deeds, not years,
In thoughts, not breaths,
In feelings, not in figures on a dial'

And in that sense the life of Theodore N. Vail exceeded that of the patriarchs.

"A human and kindly man, he bound into one loyal family a quarter of a million telephone men and women, and made neighbors of a hundred million people.

"The Telephone Pioneers will ever hold his memory dear, and in the years to come his life will prove

Mr. L. B. McFarlane, president Bell Telephone Co. of Canada, congratulating Mr. H. B Thayer, president American Telephone and Telegraph Company, on his election to the office of president of the Telephone Pioneers.

an inspiration to nobler thought and higher effort on the part of every member of the great telephone family."

It was moved and seconded that the above resolution be engrossed and copies sent the family of the late Theodore N. Vail.

At the afternoon session the following pioneers were given the distinction of being elected honorary members, which places them amongst the ranks of old pioneers. Messrs. T. D. Lockwood, T. B. Doolittle, L. B. MacFarlane and K. J. Dunstan.

Relations With Employees.

Mr. W. H. Black, secretary of the Bell Telephone Company, read a paper on relations between telephone executives and the rank and file. "Employees these days," he said, "are taken into the confidence of the heads, and instructed to reason and think for themselves." Mr. Black likened the telephone executives to Marshals Foch and Haig, who commanded from distances of thirty to forty miles behind the front line trenches.

The Halifax Disaster.

Another address was given by Mr. J. H. Winfield, manager of the Maritime Telephone Company. Mr. Winfield told of the great Halifax explosion in December, 1917, and the manner in which telephone stations had been affected.

"The explosion could not have happened at a worse time," said Mr. Winfield, "as a new telephone station was to have been cut in the following day. The windows of the new exchange were blown in, and considerable damage was done to the relays and cables by pieces of flying glass. Terrific storms hampered the work of the repairmen, but nevertheless they strove valiantly to repair the damage. This was done in record time. Provision had to be made members of the staff who had lost their homes. In some cases the telephone operators slept in front of the switchboards. The breaking of the long distance cable running out of Halifax, cut the city completely off from the outside world. In addition to this, the submarine cable stretching the harbor was also broken. This was caused by the terrific storms which followed the explosion.

Mr. Winifield stated that only two telephone employees were killed, and that these two were telephone operators who were off duty at the time of the explosion. He paid a great tribute to the repairmen and operators who stuck loyally to their posts day and night.

In closing Mr. Winfield stated that all the damage had been repaired in record time and that, in one sense, the explosion had done Halifax quite a lot of good, because a town planning scheme had been introduced in the devastated area.

Mr. E. K. Hall, vice-president of the American Telephone and Telegraph Company, was another afternoon speaker.

On Sunday, September 12, the U. S. delegates left by special train for New York.

Publicity—The Solution of the Biggest Problem of Electric Light and Power Industry

By Mr. Geo. F. Oxley*

Publicity, 1 pub-lis-i-ty; 2 pub-lic-i-ty, n.—The state of being public or open to common knowledge; exposure to the view or knowledge of the public; notoriety; opposed to secrecy—

Indefining the word publicity as above, Noah Webster performed a real service for the electric light and power industry. In a few words he has outlined the policy which if carried out successfully, will solve the biggest present problem of that industry—securing the good will of the American public and thereby re-establishing public faith in and the credit of the industry.

Every officer of every electric light and power company should memorize that definition, and, having memorized it, should put into practice through the executive officer of his company, the principles contained therein, so far as facts concerning the electric light and power industry are concerned.

Executives and influential men intimately associated with and deeply interested in the electrical industry, invariably state that the present single outstanding need of the electric light and power industry is the securing of adequate financial support for extensions of plant and transmission equipment. Without doubt this is true. Equally without doubt there are other needs bordering upon the same plane of importance.

It is my belief that all of these problems have a common point of contact with the public and that, therefore, the education of the public regarding the industry must be so placed before the public that the people as a whole will have faith in it and therefore support it, morally and financially.

The electric light and power companies are in the hands of the public. They are in a peculiar position. They are dependent upon the public for patronage and at the same time rely upon the patronage to fix the rates they can charge for service and to frame the rules and regulations under which they shall give service.

This power of the public is vested in state or municipal regulatory bodies. In the United States, forty-five of the forty-eight states have regulatory commissions, practically all of which are empowered to control both the service and rates of electric light and power companies. These commissions invariably act for what they consider to be the best interests of the public. In this, they necessarily are governed by the wishes of the public as they, the commissions, interpret them.

Education of the Public.

The solution of the problem, therefore, is fundamental. It is the enlightenment of the public so that it will understand not only generally, but specifically, every important phase of the electric light and power industry. This has been attempted many times in many parts of the country, but always upon a small, more or less localized, basis. The N. E. L. A. as the representative of the electric light and power industry throughout the country is undertaking through its members a campaign to enlighten the public regarding the fundamentals of the electric light industry. In doing this, its members must preach the gospel of "self-interest." They must show that every citizen of this country is directly or indirectly interested in the success and prosperity of the electric light and power industry and in the growth of that industry, not only locally, but universally.

It is estimated that from thirty million to thirty-five million inhabitants of the United States enjoy the comforts furnished by electricity in their homes. However, it is also estimated that there are fourteen million homes in the United

---

*Director Publicity, N.E.L.A.

States which are not wired for, or using, electricity. With an average of five persons to a family, this means that approximately seventy millions of people are without electricity in their homes.

When it is considered that not only the thirty millions or thirty-five millions of people using electricity, but also the greater part who are not using it, must be educated, the mammoth task ahead of the industry is apparent.

Naturally, the first point of contact must be with the users of electricity. Secondarily, it is hoped to reach all others through later developments in the programme now being outlined and carried out. The Department of Publicity has issued to all member company executives a pamphlet designed to show the necessity for the electric light and power company executive participating actively in local civic and commercial activities and also his becoming acquainted with his local newspaper editors in order that they, and through them the public, may know that he is seeking the same end they are seeking—the prosperity and growth of the community his company serves.

Articles of a national character, but of interest locally, are being sent to executives of member companies and distributed otherwise for publication in the press of the country in order that the general public may be advised of matters coming up from day to day, which are of interest not only to the electrical industry as such, but to the individuals who are part owners, patrons and rate fixers of the electrical utilities.

State Committees on Public Utility Information.

In eleven states there have been organized, or are now organizing, State Committees on Public Utility Information. These are committees composed of leading representatives of the electric light and power industry, the gas industry, the street railway industry and the telephone industry. These committees are organized for the sole purpose of placing before the public facts and figures and statements of happenings, absolutely without color or prejudice, for the sake of enlightening the public regarding existing conditions and their effect upon the public utilities. The N. E. L. A. through its Public Relations Section and the Publicity Department is endeavoring to interest leaders of the electric light and power industry in every state in the plan for organizing such committees on public utility information in each of the remaining thirty-seven states of the country. It is hoped that this will be accomplished within the next few months, and, when accomplished, the N. E. L. A., through the Publicity Department, will furnish every possible assistance to each and all of the committees in preparing information to be handed on to the public and also in exchanging ideas between the several state committees. It is not the purpose of the N. E. L. A. to attempt in any way to direct any of these committees, whose problems are invariably local in character and yet invariably have a bearing on the national situation and national problems.

A comprehensive campaign of education of the people in commonly used electric terms has been undertaken by this department. This campaign necessarily will be carried on through the individual member companies which will be furnished with pamphlets at cost, designed to be sent out with the monthly statements for electric service or in such other manner as the local company may determine.

Since the financial problem undoubtedly at present is, and for some time will be, paramount, a campaign extending over at least a year has been devised and a figure known as "Kilo Watt" adopted for use in pamphlet form or for general advertising, as a medium and point of contact with the housewife and householder.

The first six of this series of pamphlets have been prepared and sent out with a plan of campaign, together with the three other pamphlets mentioned above, which define some of the terms and some of the facts regarding the electrical industry.

The "Kilo Watt" pamphlets are written in a lighter vein and are designed to interest the recipients and teach them to expect one of these pamphlets each month, either with the service bill, or otherwise. Once the point of contact has been established, "Kilo Watt" then will be used further to educate the public in some of the more specific problems of the electric light and power industry, such as financing, the building of extensions, the maintenance of equipment, etc. These pamphlets are not designed at present to popularize electricity, nor to increase the use of electricity, since this not only would be useless at present, but we believe would be exceedingly poor policy, because of the fact that practically all of the companies of the country are now giving service to the utmost limit of their capacity, while perhaps 50 per cent. of the companies are unable to give the full amount of service demanded.

The Publicity Department is co-operating with the Investment Bankers' Association and has plans now under way for co-operating with other agencies, which we believe will prove of benefit in placing the entire electric light and power industry matter before the public. It is through these other associations, and through articles in popular magazines, the first of which will appear within the next six weeks, that we hope to reach many of the seventy million or more people who are not users of electricity and who, therefore, cannot be reached directly as patrons of electric light and power companies.

Approve Grounding Secondaries to Water Pipes

The following resolution, formally approving the grounding of secondaries of electric light systems to water pipe systems, was adopted at a recent convention of the American Water Works Association:

"Whereas, the grounding of the secondaries of lighting transformers to water pipes promotes the safeguarding of life and does not constitute a hazard to the piping system, be it

"Resolved, that the American Water Works Association approves the practice of grounding the secondaries of the lighting transformers to the water pipes, providing that the grounding is done in accordance with the rules of the National Electrical Code and the National Safety Code."

220,000 Volt Transmission Line to be Installed in West

For transmitting energy from its new Pit River hydro-electric development, the Pacific Gas and Electric Company will use 220,000 as the transmission voltage. The energy will be transformed at the station to this voltage by 16,667 kv.a., 127,000 volt, single-phase, water-cooled, outdoor type Westinghouse transformers connected in star for 220,000 volts. There will be two banks of three of these transformers, thus making a total rating of 100,000 kv.a. An additional emergency transformer will also be installed to be used on either bank.

"Safety" is Good Business

At a recent meeting of the Ontario Division of the Canadian Manufacturers' Association ,Mr. R. M. Little, director of the Safety Institute of America, New York, explained the general programme of the safety movement in the United States and Canada by which the health and lives of workers in all kinds of industries and of the citizens as a whole are being safeguarded. Mr. Little stated that the safety movement was good business from the standpoint of economy, humanity and efficiency, and that business men had awakened to the fact that it is better to spend money to prevent accidents than to pay for them after they had happened.

There is Room for Greater Economics in Small Plants

The Fact That a Generating Plant is Small Should Not Mean that It is Inefficient—A Practical Talk by a Man Who Has Had Wide Experience in Operating—Sustained Effort Essential—Read What He Says*

Experience in the operation of many different types of small steam plants indicates that the necessity for sustained effort along the line of mechanical operating economy is not always obvious to the average decentralized plant operator. This may be due to his inattention to details, to indifference or ignorance on the part of his employees or to lack of a proper complement of recording and measuring devices in the boiler room. The most important causes of low plant efficiency are, first, dirty boilers; second, leaky settings, and third, improper firing.

Effect of Dirty Boilers

The loss due to accumulation of soot and scale is the greatest single item of loss incident to the operation of boilers. The accumulation of soot in horizontal tubular boilers not only insulates the heating surface, thereby reducing the capacity of the metal to conduct heat from the fire to the water, but by decreasing the area of the flues it also acts to reduce the quantity of coal that may be burned in the furnaces and consequently limits the capacity of the boilers for making steam. The heat-absorbing capacity of water-tube boilers is likewise greatly reduced where a coating of soot is present on the tubes, and efficient plant operation should provide for the systematic cleaning of all exposed heating surfaces by means either of mechanical soot blowers, the lance or the brush. Where there is sufficient steam pressure for their operation, mechanical suit blowers should be installed, as with systematic operation they will pay for themselves in a comparatively short period.

Even more important than the necessity for keeping the dry surfaces of the boilers free from soot is the need of systematic and regular washing to keep the wet surface free from the accumulation of scale and foreign matter The intervening time between washings is governed by the feed water utilized and by the quantity of steam generated, but as a general rule the boilers in these St. Louis plants are washed once a month. In a similar manner at proper intervals boilers should be made entirely free from scale. With St Louis water one or two cleanings per year suffice, but in the Missouri lead belt the water is so hard that, with the exception of those plants equipped with water softeners, the boilers need cleaning every month.

Treating Water to Eliminate Scale Troubles

Where the water utilized in a boiler plant contains large quantities of scale-forming matter, this material should be removed before the water is delivered to the boilers. An analysis of the water used for boiler-feed purposes can readily be obtained and in a majority of cases a large proportion of the scale-forming solid matter may be removed at no great expense In many waters containing sulphates of lime and magnesium the introduction of barium hydrate will react with the sulphates in the water and reduce them to a sludge (instead of a scale), which may be easily removed with the boiler blow-downs. Only sufficient barium sulphate is used to react with the quantity of sulphates shown in the analysis of the water.

Many of the boiler compounds on the market are guaranteed to prevent or remove scale, but unless the proper compound is used for the particular characteristics of the water to be treated, the compound may do more harm than good. The priming of boilers is due to the over-concentration of certain impurities which are in solution in the water, and the tendency of many of the boiler compounds now on the market is to increase the concentration of these particular substances in the water, thereby causing foaming or priming. Soda ash has been commonly used in boilers for the prevention of scale. The amount of soda ash which can safely be used without causing an over-concentration of the chemical in the water depends upon the particular conditions of the boiler plant, but under no circumstance should the amount of sodium sulphate exceed 100 grains per gallon.

The chlorine content of the boiler water is a good indicator of the concentration of the impurities which tend to cause priming. A simple test to determine the chlorine content consists in the titrating of 50 cu.cm. of the boiler water with a one-tenth normal silver-nitrate solution, using potassium bichromate as an indicator. If the chlorine content of the water is kept below 3 grains per gallon there will be little likelihood of priming even when operating the boilers at high over-ratings.

In some of the plants being discussed small steam-driven reciprocating units are utilized for mechanical service equipment, and in many there are engine-driven electric generators the exhaust from which is sent to a piping system and utilized for heating purposes. In the exhaust of such units oil is present and unless entirely removed will work its way back to the boilers. The presence of oil or grease deposits in a boiler offers a great deal more resistance to heat than does scale, and tests have shown that even a film 0.001 in. in thickness can cause far more injury than 0.125 in. of scale. Various explanations are given of this fact, one of which is that thin films of grease form tough bubbles on the heating surface and prevent the water from keeping it cool. To prevent the oil present in exhaust steam from working back into heaters and boilers, oil separators should be installed and kept in first-class condition at all times. The great loss in economy which is incident to the presence of oil within the boiler, as well as the danger of overheating the metal of the boiler, is of such a serious character as to warrant the taking of every possible precaution toward its prevention.

The second general cause for the gradual reduction in boiler operating efficiency is found in leaky settings. These may be internal leaks in the baffles which permit the gases to go directly to the stack before they have come in contact with the heating surface of the boiler. Leaks in the boiler settings may also permit the infiltration of air to the combustion space, thereby providing an excess supply of air with consequent imperfect combustion of the gases. Broken baffles and leaky settings defeat the very object for which the boiler was built—i.e., to absorb the heat liberated from the coal.

Imperfect Combustion Results From Improper Firing.

Even clean, tight boilers may be operated in such a manner as to result in imperfect combustion and very low plant economy. To burn coal effectively it is necessary that there be a proper supply and distribution of air throughout the fuel bed and that the fuel bed itself be in such condition and of such temperature as to permit the volatilization of gas from the fuel and its ignition after proper mixture with the air.

---

*E. H. Tenney, Chief Engineer of Power Plants, Union Electric [illegible]

Proper firing of a furnace involves knowledge on the part of firemen of the fundamental principles of combustion. Firemen should be made to understand that the placing of large quantities of coal on the grates at one time retards the air supply, cools the fuel bed and prevents perfect combustion, with the result that the furnaces smoke badly. The men must learn too that accumulation of ash and clinkers on the grates will also reduce the proper distribution of air to the fuel bed, resulting in imperfect combustion. With improper firing it is entirely possible for one-half of the calorific value of the fuel to be lost through imperfect combustion.

Everything does not depend on the firemen. They must be supplied with the quality and size of fuel which is most suitable to the equipment and particular operating conditions of the plant. In some plants the station results are sufficiently improved by the change from a low-grade coal to a high-grade coal to warrant the use of the better coal regardless of price, while under other conditions the cheaper coal is more economical. After obtaining the most suitable coal, it should be conserved and the firemen instructed so to handle the furnaces that a minimum amount of unburned coal gets to the ashpit. Tests should be made, preferably daily, to determine the amount of combustible in the ash.

Use of Boiler Room Instruments.

In order to obtain sufficient data for a complete record of plant operation, it is necessary that there be a full quota of instruments. Aside from the ordinary instruments and accessories to be found on every boiler installation, it is almost essential, if economical operation is desired, that other instruments be provided.

Steam-flow meters are needed to indicate continuously the amount of steam delivered by the boilers. Whether these instruments should be of the type which record as well as indicate the steam output will depend upon the preference of the engineer in charge and upon local conditions. An indicating instrument is of prime importance to the fireman as it enables him to judge at a glance the results of his plant operation as shown by horsepower and output The addition of the recording feature makes it possible to analyze conditions at a later date in the office.

Indicating draft gauges should be installed on each boiler unit. Proper operating conditions should be established and the corresponding draft readings determined upon; then the draft gauge will prove an important factor in indicating irregularities to the fireman.

The temperature of flue gases as they leave the boiler setting fluctuates with changes in operation conditions, and intelligent control of these conditions is almost impossible without a temperature record of the outgoing flue gases. Most efficient operating conditions are established upon the basis of a certain outlet gas temperature for each boiler, and without these instruments a proper temperature control can be established and maintained only with great difficulty.

Orsat apparatus is required to determine the carbon dioxide content of the flue gases Many simplified types of this appartus are now upon the market, permitting the quick and accurate measurement of CO_2. Inasmuch as the carbon dioxide in the flue gases is a direct measurement of the completeness of the combustion, this instrument should be in active and constant use in every boiler room.

Water metering apparatus is needed to measure accurately the quantities of water delivered to the boiler from the feed pumps, and a measurement should also be made of the so-called "make-up water" which is delivered to the system.

It is of especial advantage to be able to weigh all fuel which is delivered to the boilers, and when this is impracticable the coal bunkers may be calibrated so that the amount of fuel burned can be very closely estimated every day.

The amount of water evaporated per pound of coal gives a check upon the running efficiency of the plant, and these figures are derived from the daily record of the pounds of coal burned and the pounds of steam generated The form shown in the log sheet on page 616 is utilized by the operating engineers of each plant to record the daily operations. This form has been made to cover the conditions in all of the twenty-eight plants listed in Table I.

TABLE 1—THESE TWENTY-EIGHT PLANTS ARE TYPICAL AS TO THE EQUIPMENT IN THE AVERAGE SMALL PLANT

F. T.—Fire-tube boiler. **W. T.—Water-tube boiler.**

	Boilers				Generators		
Plant	No.	Type	Firing and Furnaces	Total Hp.	No.	Prime Mover	Total Kw.
A	2	F. T.	Hand-fired down draft	300	..	....	...
B	2	F. T.	Hand-fired down draft	150	..	....	...
C	2	W. T.	Shaking grates	416	..	....	
D	3	F. T.	Hand-fired down draft	300	2	Recip. eng.	125
E	2	F. T.	Hand-fired down draft	180	2	Recip. eng.	100
F	5	F. T.	Hand-fired down draft	450	3	Recip. eng	225
G	3	W. T.	Shaking grates	721	3	Recip. eng.	375
H	1	F. T.	Hand-fired down draft	60	..	....	...
I	2	F. T.	Hand-fired down draft	300	..	....	..
J	2	F. T.	Hand-fired down draft	500	..	....	...
K	3	F. T.	Hand-fired down draft	375	..	....	...
L	3	W. T.	Hand-fired down draft	450	..	....	.
M	2	F. T.	Hand-fired down draft	350	..	....	...
N	2	W. T.	Hand-fired down draft	600		....	...
O	2	F. T.	Hand-fired down draft	300	..	....	...
P	2	F. T.	Hand-fired down draft	600	2	Recip. eng.	500
Q	3	F. T.	Hand-fired down draft	825	3	Recip. eng.	544
R	3	F. T.	Hand-fired down draft	525	..	....	...
S	1	F. T.	Hand-fired down draft	100	.	....	..
T	2	F. T.	Hand-fired down draft	150	..	....	...
U	3	F. T.	Hand-fired down draft	375	3	Recip. eng.	131
V	3	F. T.	Hand-fired down draft	400	1	Recip. eng.	75
W	3	W. T.	Chain grates	1 350	3	Recip. eng.	600
X	2	F. T.	Hand-fired down draft	500	..	....	...
Y	1	F. T.	Hand-fired down draft	175	..	....	...
Z	3	F. T.	Hand-fired down draft	450	..	....	...
AX	3	W. T.	Chain grates	1,500	2	Turbine	1,200
BX	3	F. T.	Hand-fired down draft	300	..	....	..

Supplementing a proper and complete quota of boiler-room meters and instruments, the plant organization and supervision must be such as to insure continued and conscientious watchfulness on the part of the plant operatives. All data and records at best are but guides to assist the engineer in maintaining intelligent operating conditions, and unless such conditions are studiously maintained it is not possible to obtain high plant efficiencies.

Falling off in the evaporation per pound of coal, increasing stack temperatures and increasing difficulty in maintaining boiler output are indications that the boilers should be cleaned. The trouble is probably due to the presence of fly ash, soot, and accumulations of heat-insulating substances inside the boiler. The engineer's observation of his equipment, taking into account his knowledge of the length of time since previous cleaning has taken place, will tell him whether or not more attention should be devoted to this phase of operating maintenance.

Improper firing will be readily indicated by a lower carbon dioxide content of the flue gases, bu an increased percentage of combustible fuel in the ashpits, by smoky stacks, by the boiler-horsepower capacity being maintained only with difficulty, by reduced evaporation per pound of coal and by routine observation of the fires. Any one of these items will serve as an indicator that operating methods are not what they should be, and the very best preventive against such improper firing conditions is in an intelligent, conscientious fireman or expert supervision.

The detection of leaks in boiler settings may be a difficult matter. They cannot always be detected by observation, nor will the carbon-dioxide content of the flue gases necessarily indicate their presence. Leaks through the side walls, however, are readily detected by [illegible] candle flame and may then be remedied. Baffle leaks can only be detected by observation of the draft and temperature readings throughout the setting in reference to standard operating conditions. The tremendous waste which may occur inside boiler settings, both on account of the by-passing of hot gases directly to the stacks and on account of the admission of excess quantities of air to the detriment of the combustion processes, is of such extent and importance that it requires continuous conscientious vigilance on the part of the operator.

Neglect Reduces Safety Factor of Boilers.

The seriousness attached to neglect of many of the points which have been referred to above is of such extent as to warrant the taking of radical steps for their prevention. For instance, soot deposits upon the dry surfaces of the boiler contain sulphur trioxide, which combines readily with moisture supplied from the air and the fuel and changes at ordinary temperatures to sulphuric acid. This acid reacts upon the boiler flues and headers and if allowed to remain will gradually waste them away and dangerously weaken them. Scale deposits, in addition to decreasing the conductivity of the material separating the water from the fire, also tend to overheat the metal, thereby reducing the boiler operating factor of safety. These reductions in strength of the metal parts of a boiler have in many instances resulted in damage to heads, drums and wrapper sheets.

One of the most dangerous features in the operation of boiler plants which are only required during the winter months is the temptation to neglect the necessary maintenance work after a season of heating operation has been completed. Good operating economy requires that the steam generating, mechanical and electrical equipment be put in a first-class state of repair prior to the opening of each heating season. However, to know when to replace worn parts with new parts—in short, to know what work to do and what work not to do—requires the exercise of sound judgment based on long operating experience.

In the case of boilers operated but a portion of the year the pitting of shells is apt to become serious, especially where water has been permitted to remain in the boilers at times when not in operation. At least once in twelve months every boiler drum should be dried out, thoroughly cleaned and carefully inspected for evidence of pitting and corrosion. Where such action is found its prevention must be the subject of special attention and concern. Exterior corrosion may be checked by cleaning and painting, but a panacea for internal corrosion has not yet been found. Probably the best preventive of pitting and corrosion in boilers is their continued operation under suitable conditions and with proper feed water. All attempts to check corrosion by the application of protective coatings to the inside of boilers are but temporary and seldom sucessful.

The maintenance of flues and tubes is a matter of routine for the plant engineer, who in most cases is periodically checked up on this feature of the maintenance by the municipal and insurance company inspectors. The maintenance of boiler settings, baffles, dampers, etc., is also a matter of routine for the plant engineer, and the success with which he maintains his eqiupment is a measure of his proficiency.

The most important feature of furnace maintenance is found in the necessity for continued renewals of bridge walls and furnace linings, as well as ignition arches and door liners. The frequency with which repairs of this nature must be made is a function, of course, of the extent of the furnace operation. Furnaces operated over extended periods and at high ratings require renewals more frequently than those operated for shorter periods and under less exacting operating conditions. Under ordinary conditions, with the type of boiler operation under discussion, a well-built furnace should stand up for eight months before the necessity for extending renewals in the furnace linings or bridge wall becomes apparent. In a similar manner down draft tubes, grate bars, door liners, etc., should not require extensive repairs oftener than once each season. The same is also true in the case of automatic stokers, which should be given a thorough overhauling and renewal of worn parts once each year.

Table II—Typical Present-day Costs for Maintenance Work in Boiler Plants

Cost Per Boiler h.p. of Rating Per Annum

Plant W in Table I.

Boiler and settings	$3.24
Furnaces and stokers	.77
Piping	.79
Total	$4.80

Plant A in Table I.

Boilers and settings	$2.96
Furnaces and stokers	.29
Piping	.58
Total	$3.83

Higher Fare on Street Railways is the Only Solution

First Seattle adopted a ten cent fare, when twelve months previously they had denied a private company, then running the street railway, to raise fares over the nickel stage. Next in the dime column came Calgary, and last week Regina succumbed and passed over to the ten cent stage. Incidentally Brandon, during the fair week, charged a ten cent fare.

In Saskatoon the City Council there is face to face with a deficit of $40,000 for the past year's operation of its street railway. They have had seven cent fare there for some time, and while this added to revenues, yet operating costs have increased in greater ratio. Reduced service has been tried in the endeavor to make ends meet, but has caused more dissatisfaction than it was worth.

The history of the street railway experiences in these "municipally-owned" cities is interesting. Raises in fares have been more rapid, and more steep, in spite of the fact that the latter are saddled with pavement charges, franchise taxes, and other burdens which are not chargeable to the car riders when the road passes over to the city. There is one commendable feature about municipal ownership of street railways, as shown by the experiences of these western lines, and that is as soon as revenues become inadequate, fares are raised by the simple expedient of introducing a resolution in council and passing same. Most privately-owned companies, heirs to the same ills as afflict the municipal ones, have to go through a period of "corporation baiting" and legal fighting resulting in an expenditure of thousands of dollars. This money has to be paid out of car fares, and makes a big contribution towards the necessity of the private company applying again for a further increase.—W. E. R. Service News.

Mr. H. Hulatt Consulting Manager of Telegraphs

Mr. H. F. Whittenberger, general manager, Grand Trunk Lines west of the Detroit and St. Clair Rivers, announces the appointment of Mr. H. Hulatt as consulting manager of telegraphs. Mr. Hulatt is manager of telegraphs, Grand Trunk Pacific Railway and the Grand Trunk Pacific Telegraph Company.

Possibilities Along the Line of Better Street Car Service To and From the Railway Depot

The desirability of giving better service to and from railway stations and also giving more publicity to that service was discussed at the recent midsummer convention of the Illinois Electric Railway Association. The discussion was introduced by Mr. W. M. White, who expressed himself in part as follows:

At a time when electric railways are doing many things to stimulate the habit of street car riding, why is not more specific attention given to passenger traffic to and from steam railway stations? Why do taxicabs and buses secure so much of this trade when street cars are available? Why do not electric railway men do more to give the depot car lines every possible opportunity to carry larger passenger loads between the steam terminals and business and residence sections of their cities ?

In dealing with the incoming passenger business you have three phases of the situation to consider. First there are those people who are familiar with the town they are entering. They know whether they can reach their destinations conveniently by trolley and what car to take. They know what the prevailing rate of fare was when they left town and they know how long they will be enroute. This traffic is fostered by your customary methods and frequency of service and if these passengers prefer to pay a high taxi fare it is at their own violition, unless the car service for them is actually inconvenient. But the majority will use street cars if an adequate schedule is offered.

“Secondly, there are those people who are strangers and prefer to take a cab or bus, rather than to be recognized as strangers by having to ask a policeman or station porter or someone else for directions. It may seem peculiar to have this distinction made, but I am sure you will agree that the average traveling man does not like to stand around asking how to reach his hotel. So he jumps into a cab and pays seven to ten times more than street car fare to reach his destination and the few minutes that he saves thereby is ordinarily not worth it.

“Thirdly, there are many travelers who take cabs from force of habit, a habit acquired perhaps when they were strangers and never learned that a convenient street car service was being maintained. Of course many persons take individual means of transportation because they can well afford it and it is their desire. And many, it is to be regretted, do so because of previous experience with long waits forced by non-appearance of trolley cars. I am thinking, however, of thousands of travelers of moderate means and reasonable minds who would prefer to pay 5, 6 or 7 cents for a trolley trip to their hotels or homes, instead of a flat 50 cents or a taxi rate of 50 cents at least and usually more.

Regaining Lost Patronage

“Nearly every street car system operates lines reaching the railroad stations and hotels, and ordinarily seeks every possible source of revenue. Quite often it costs more to gather up a few fares than the amount taken in. But, if in so doing, the habit of street car usage is fostered and that of dependence on cabs is reduced, the effort is worth while. The problem then is not to originate revenue traffic but to corral that which is available and which to the railways at present is lost. I am offering some suggestions which would cost little to put into effect and are entirely feasible.

A railroad station crowd usually needs only to be politely directed. But when the people emerge from a station they are greeted by cries of 'Taxi, taxi!' 'Cab, cab!' 'Busses to hotels,' and similar invitations. Now why not surprise them by letting them hear 'Street car to all hotels,' 'Street car down town,' 'Street car to all points. This way please.'

Or at least why not post a prominent sign which might read 'Street car leaves this Station every 4 minutes for Hotels and all Parts of the City. Fare 6 cents.' Or perhaps this—'Street Cars Leave this Point every 6 Minutes. Frequent, Safe Service to Business and Resident Parts of the City. Fare 7 cents.'

Use More Signs

I think that electric railways do not make sufficient use of signs to direct passengers. We know of signs which have been of great value, such as those which the Chicago Elevated Railways have painted on their structures. Tens of thousands of persons every day follow the painted arrows in the New York subway stations. The skip-stop and the later plan of loading berths have led to the use of 'Car-stop' signs, but we need more signs of an informative nature and the wider use of them should be considered by all railway managers. A splendid start could be made at the steam railway stations and then on trolley poles opposite the hotel entrances. Don't you think it would please a great many travelers to see a sign across from their hotels reading 'Street Car to Union Depot, every 5 minutes. Fare 7 cents.'

A sign tells its story all day long and may easily be illuminated for night display.

In almost every city there are certain hours when a large number of people arrive at the stations on important trains. I believe the street car companies would do well to have a man 'on the spot.' Every company employs a number of uniformed street men, inspectors, superivsors and others who could be used. There should be no logical objection to the active solicitation of business which daily escapes because of passive methods. A special gathering in some locality at infrequent periods will receive the particular attention of the transportation department and yet daily, hundreds of possible fares pass through the railroad station's gates unnoticed. The street car companies can invite this patronage as surely and more properly than do the taxicab drivers.

It may not be necessary to assign a representative to this work exclusively at any one station unless the business warrants it. But that inspector in his daily wanderings might just as well as not, be at the Union Station when the morning trains come in, or at the Central Station when the afternoon Limited arrives. And he would become a business-getter for the company.

Keep in Touch with Train Schedules

Coincident with this it would be wise for the traffic departments to make a closer study of the time of train arrivals and of average loads. Most street railway companies endeavor to provide a good station service, but suppose you are running a 10 or 12 minute headway in the middle of the day and your car leaves the station at 11:10 a.m. when a train is due at 11.13;. Or perhaps the 3:36 p.m. car meets a train on which records show a heavy passenger traffic arriving. Here is a chance for a beneficial change in the street car schedule, because trains often arrive on time and the non-appearance of a car for even five minutes will greatly increase taxicab patronage. I feel sure that the cases mentioned are entirely possible and may be occurring in many places.

A Car Always in Sight

The [illegible] has given us the slogan 'A car always in sight' and this thought is justly popular in street car offices to-day. Now why not apply this effectively to the depot car line? A sign is good, a uniformed announcer is better, but best of all would be a waiting car. All the cries of taxicab drivers would avail little against the presence of a street car and it would draw the crowd as positively as a magnet acts on iron-fillings. I think the constant presence of a street car is entirely feasible. If the line passing the station is a busy one with a headway of a minute or two, or even less, there would always be a car in sight, down the street perhaps. Why not hold each car until the next one arrives, using this as a point for checking car movements and schedules and at the same time secure the advantage of always having a car at the station. And if the station is on a single line with a longer headway, why not have your layover there instead of at some unimportant place at the far end of town. A station lay-over point would offer conveni? ences for your crews and I would again suggest that each car await the arrival of the next following one before departing.

In conclusion, I am going to offer a suggestion concerning the platform men on the depot cars. These cars should be manned by crews who can politely and intelligently handle strangers, who know the city, are willing to answer questions and to call the names of streets and hotels. They should be coached on the value of this business and urged to co-operate. They should be instructed not to pull away just when a train arrives, for nothing is more aggravating to those coming through a station than to see a car just departing when so many more passengers could be carried. The trouble is that the average crew considers the schedule more important than public service and the filling of the fare box. Where a delay of 2 or even 3 minutes would fill a car with pleased passengers, it is worth while to wait.

"We have all heard exclamations like these—"Gee, we were lucky to catch a car right away," "Thanks for waiting," "This is fine," and isn't that far better in the psychology of public relations than "Oh, Shaw! Why didn't they wait," or "Just my luck to miss that car." Or what is far worse, "Well, I guess we'd better take a cab."

The Effect on Earnings of the Increased Fare

The effect of changing from a five cent fare to a seven cent and then on to a ten cent fare was recently explained by the superintendent of the Chicago and Juliet Eletcric Railway, before the convention of the Illinois Electric Railway Association. "Electric Traction" publishes the following [illegible]

The Ten-Cent Fare

The figures were prepared from the experience with the ten cent fare in Joliet, Illinois. The increase from a five to a seven-cent fare was made in Joliet in August, 1918, and the increase from a seven to a ten-cent fare was made effective in August, 1919. The four months remaining in 1919 showed a decrease in traffic of 1.4 per cent. The following table shows statistics for the first six months of each of the years 1918, 1919 and 1920.

Period.	Fare	Passengers Carried
Jan. 1, 1918 to June 30, 1918	5c	2,916,691
Jan. 1, 1919 to June 30, 1919..........,	7c	2,485,633
Jan. 1, 1920 to June 30, 1920	10c	2,574,901

The seven-cent-fare period compared with the five-cent-fare period shows a decrease in traffic of 16 per cent with an increase in fare of 40 per cent. The ten-cent-fare period compared with the seven-cent-fare period shows an increase in traffic of 3.6 per cent. and an increase in fare of 42.7 per cent. The ten-cent-fare period compared with the five-cent fare period shows a decrease of 13 per cent. in traffic with an increase of 100 per cent in fare.

Revenue for the above periods were as follows:

Period	Fare	Revenue from Passengers
Jan. 1, 1918 to June 30, 1918..........	5c	$146,961.00
Jan. 1, 1919 to June 30, 1919..........	7c	174,005.00
Jan. 1, 1920 to June 30, 1920.........	10c	248,442.00

In this table the seven-cent-fare period compared with the five-cent-fare period shows that with a 40 per cent. increase in fares there was an increase of 18.4 per cent. in revenue. The ten-cent-fare period compared with the seven-cent-fare period shows that with an increase of 42.7 per cent in fares there was an increase of 42,8 per cent. in revenue. The five-cent-fare period compared with the ten-cent-fare period shows that with an increase of 100 per cent. in fares there was an increase of 69.2 per cent. in revenue. It was stated that there had been very much less complaint from the public in putting the ten-cent fare in effect than in raising the old fare from five cents to seven cents.

Personal

Mr. W. R. Greenshields has been appointed assistant sales manager of the Canada Wire & Cable Co. following nine years' service with this company in a sales capacity. Mr. Greenshields is well and very favorably known to the electrical trade, where he eagerly identifies himself with any movement for the betterment of the industry.

Mr. E. S. Jefferies, chief electrical engineer, Steel Company of Canada, was elected president of the Association of Iron and Steel Electrical Engineers at the annual convention of this association which was held in New York City during the week ended Sept. 25th. One of the main questions discussed was that of steam vs. electric drive for reversing mills.

Mr. W. L. Bird, general manager of the Kaministiquia Power Co., Fort William, Ont., has been appointed general manager and treasurer of the Fort William Paper Co. Ltd. Mr. Bird is personally known throughout the electrical trade and universally respected and admired as well for his fine personal qualities as for the marked success he has made of the central station generating and supply company with which he has been associated for many years. Mr. Bird's generating station at Kakobeka Falls has the distinction, we believe, of holding the record for the fewest "outs" covering a long period of years. During the years 1915, 1916 and 1917 the interruptions on this system did not exceed four minutes, and from July, 1918, up to the present date there has not been a single moment's interruption to the power supply. Such a record speaks volumes for the management, and clearly indicates the wisdom of the directors of the Fort William Paper Co. in placing Mr. Bird at the head of their business.

Mr. Bird has always shown a keen appreciation of the duty of citizenship. He has been a prominent figure at practically every Canadian Electrical Association convention, and was president of that association for a term. He was also president of the Fort William Board of Trade—and a very active one at that—in 1916, and at the present time is vice-president of the Fort William Canadian Club.

The Electric Furnace Company, Alliance, Ohio, are issuing an attractive catalogue entitled "Baily Electric Furnaces." These furnaces are for melting, annealing and heat-treating non-ferreous metals; illustrated.

The Contractor-Dealer

Manufacturers and Wholesalers' "Sales Helps"

They Are Real Business Getters. Are You Making Them Get Some For You? Give Them a Thorough Try-Out This Christmas

Many manufacturers are now supplying electrical dealers with valuable sales helps which are proving most helpful. It stands to reason that a well advertised piece of equipment is easier to sell than one that is a stranger to the general public. This has been demonstrated time and again with many nationally advertised articles such as soaps, breakfast foods, flour, shoes, clothing, etc., in connection with which it is found that retailers refuse to handle in some cases articles that are not advertised, for the simple reason that the people do not ask for them and only buy them under pressure. It seems to follow therefore that the electrical appliances that are advertised the most are the easiest to sell, and the manufacturer that co-operates with the dealer in this respect would, other things being equal, appear to be the most satisfactory one for the retailer to tie up with.

There are many electrical manufacturers who advertise extensively for the benefit of the retail trade, and supply valuable sales helps, such as the Westinghouse company, the Canadian General Electric Co., the Northern Electric Co., and the Canadian National Carbon Co., which recently put on a record-breaking contest regarding their Ever-ready Dayle flashlight. The latest to come to our attention is that of the National Electric Heating Co. of Toronto. As their campaign is typical of others we outline it briefly:

In June an attractive folder was mailed to dealers featuring more particularly ranges of various kinds. This was a timely suggestion as the hot summer months incline the housewife to appliances which do not add anything to the discomfort of her work. On August 6th a general folder drawing attention to the various lines handled by the company. On August 13th a letter accompanied by an attractive folder described the toaster stove and its many uses. It was pointed out that these little folders would be supplied to dealers in any quantity free for distribution. On August 19th a similar letter was accompanied by a general folder containing brief descriptions of irons, percolators, disc, stoves, air heaters, etc. Copies of this folder also were available to the dealer. On August 26th the National people distributed a letter in Quebec accompanied by a booklet in French describing their ranges, hot plates, water-heaters, etc. On Sept. 2nd, just as the cool evenings were approaching, a letter accompanied by an attractive folder describing the Heatray was distributed suggesting among other things that the dealers try distributing more of these folders. On Sept. 9th the seventh letter was mailed urging dealers to make use of the sales helps being offered, and again drawing their attention to the useful features in connection with this publicity scheme. On Sept. 16th another very attractive folder regarding the Heatray was placed at the disposal of the dealers. Much of this printed matter is in a form which only requires the placing on of a stamp for mailing, and the typing of the address. It is publicity obtained at a minimum of trouble and expense, and without question should largely repay any dealer who takes advantage of it.

Don't Put Off Your Purchasing Till the Last Minute

If You Do It Will be the Old Story That You Haven't the Goods When the Rush Comes

Manufacturers everywhere are urging retailers not to delay too long in placing their orders. The dealer is apt to consider that the manufacturer is looking after himself more particularly in giving this advice so that he may keep his factory running and his organization in general together. However, it is only reasonable to admit that the manufacturer is taking a common sense view of the situation. If he is not in a position to anticipate the demand for raw materials he certainly cannot place his own order, and, further, even if he has the raw material when the orders come in he will not be able to manufacture as quickly as desired. As the manufacturing industry stands to-day it is a reasonable supposition that if retailers postpone the placing of their orders deliveries will be too late for the Christmas trade. We have had an expression of opinion from a number of manufacturers and others along this same line, and the following quotation is typical.

This manufacturer says: "We have had a fairly good opportunity to view the condition and we have noticed a tendency of late months to hold off buying. The impression seems to have been that there would be a substantial reduction in prices this fall. There is little indication, however, of any lowering in prices of electrical goods and the likelihood is that there will be a last minute rush, with the result that manufacturers will be swamped and unable to fill the orders. The man that gets his order in first is the one who will get the goods and reap the benefits accordingly. There is a great shortage of raw materials, notably sheet steel, which enters so largely into electrical appliances. Unless orders are placed at an early date there will be little possibility in procuring materials in time to have the goods in the customers' showrooms by the holiday season."

Will Tie in with Christmas Idea

The Hoover Suction Sweeper Co. of Canada Ltd., Hamilton, Ont., advise us that their national advertising will tie in with the Christmas idea, and that the company will get out a special Christmas window display card, will have special newspaper advertising for Christmas and special Christmas folders. All of this advertising material will be available and distributed to their dealers before November 1st. The Hoover Suction Sweeper Co. are great co-operators, and capitalize on every possibility to further the sales of their dealers.

Are You Ready— For the Christmas Trade?

Get ready for the Christmas trade!

Did you ever sit back and figure out how much business you ought to do at Christmas time, and whether you actually get your share of what is going? Do you realize how big our industry has become, how tremendously it has grown, how universally it is being looked to to solve the probelms that have vexed the race for centuries?

How much business should I do, you ask?

Well, frankly, we don't know exactly, but let us figure a little. The Canadian Statistical Department haven't got around to electrical matters yet, but down in the United States they have been gathering data for some little time. A recent estimate of the sales value of electrical equipment down there for one year was two billion dollars. Now, Canada has a population of approximately 10 per cent. of the United States, which means that we should merchandise $200,000,000 worth of electrical goods, at least, in 1920.

That's a good figure to start with and perhaps not far from the true value. It works out at $20 per capita, about, which is less than half what they claim to be doing down in California right now and for some years past.

How many people do you sell in a year? How many are there in the area covered by your service that you might sell? Are they nearly the same, or do you fall far short?

Does your constituency include a thousand people. That's only two hundred and fifty homes, let us say—that's twenty thousand dollars' worth of business. Are you getting that much? It's there!

Perhaps you can reach more than a thousand. If so, just multiply by 20 and place the figure beside your actual sales total. How do they correspond?

Now, about this Chriistmas trade?

A prominent dealer in December, 1919, did twenty-five per cent. of his year's business. This should be nothing unusual. If you with your two hundred and fifty homes and your twenty thousand dollar business can maintain this standard your turnover will be just $5,000 in December.

Conservative Estimates

A good many dealers may say that a five thousand turnover in December is not very much. Well, that depends? The point is that there is a turnover of $5,000 per 1,000 inhabitants. That is $5.00 per capita. Now take, let us say Montreal. Montreal has a population of 600,000. At $5.00 per capita this totals $3,000,000 worth of business in December. This means 600 stores at $5,000 each. Yet there are nothing like six hundred stores in Montreal, nor half that amount. Probably 100 would cover good, bad and indifferent—possibly fifty. And fifty stores would need to average $60,000 apiece in December to reach that total of $3,000,000. However, it is probably safe to say that no single electric store in Montreal did that much business. The average of fifty stores was perhaps not more than ten thousand dollars—probably not more than five. The total sales value for this big city was thus not more than $250,000—one twelfth of what it ought to be.

"Now hold on" you say. "Two hundred million dollars is a big pile of money. Do you really think Canadian people have that much money to spend on electrical goods?"

Let's see, again! How much money have Canadians to spend in a year? We have ten million people or, say, two and a half million families. What can we say is the average income to-day? Certainly not less than $2,000. Two and a half million families at $2,000 each totals $5,000,000,000. Is four per cent. of this too much for electrical goods—electrical **furniture**—for goods used in every room in the house, every day in the year, that takes the place of the best servant obtainable at a cost of five to ten times the amount of money?

How many famiiies spend more than four per cent. of their income on luxuries, things that have no value beyond the momentary realiation of a whim? The electrical dealer may have an easy conscience. If he sells merchandise to the extent of twenty dollars per head, or twice that amount he is giving good value for every cent received, he is urging no expenditure that the people of Canada cannot afford, and he is raising the standard of our national home life and our national ideals, who can say, perhaps even more than our schools and churches. For a weary man or woman is disgruntled and discontented and any agency that makes for less leg and arm weariness is a powerful factor in removing the seeds of ultra socialism and bolshevism. If for no other reason than that you are a philanthropist, sell more electrical goods—to rich and poor alike.

Get Stock In On Time

Get your stock in hand as early as possible. There is nothing so provoking either for the customer or the dealer as uncertainty of delivery.

The reason many dealers hesitate to place their orders for Christmas stock is just simply stage fright, they fear they won't be able to dispose of them. But fear should have no place in the electrical contractors business—**need** have no place. Make up your mind, using your own best judgment, as to what you can dispose of if you put your heart into it—then **buy.**

Having bought, you are committed to a vigorous selling campaign. You can't turn back. You can't let up for a moment. That means that you are going to give the very best that is in you to make your Christmas sale a success and put bigger profits in the bank.

Then Plan for Campaign

It's just human nature to put a thing off to the very last minute—and you Mr. Electrical Dealer are human. So watch yourself. Begin to plan your Christmas selling campaign to-day—there is no chance that the date of the holiday will be postponed. Consider first your store; the arrangement of goods to show them off to the best advantage; make your plans for the necessary extra sales force, and be sure to include a skilled, convincing demonstrator. If your wiring isn't heavy enough to carry a good load of devices, get it fixed up at once. What about special cartons for your small stuff, or special string, or ribbon, or labels to decorate your parcels. First impressions count for a lot you know. Every appliance on display might well carry a Christmas decoration of some sort—that marks it as a "present."

And Then Your Window

Your window trim is always one of the most valuable features of your business, but at Christmas time it is paramount. Don't leave it till the last minute. Early in December have a display that will make people stop and look—a motion feature of some kind—along with a few of your most attractive looking appliances "all dressed up" in their best. Have a prominent card—

> You are already thinking about your
>
> **CHRISTMAS PRESENTS**
>
> **How do these appeal to you?**
>
> Electrical appliances give more pleasure and happiness for the same money than anything else on earth.

Have a number of cards all ready in advance and plan out a number of window displays.

Change Your Display Often

And just a word of warning about changing the window display. Many windows are dressed for Christmas—once. What happens? The people see it, realize that you have shot your bolt, and pass you by for the man who gives them something fresh every morning. It's the **sustained** effort that counts. During the early days of December you should change your window display every two days at best and probably every day.

It's not enough to get the attention of the public. You must **keep** it.

Finally, Your Profit?

Now what profit are you going to get on your Christmas sales? On the supposition that there is going to be a pretty quick turn-over, perhaps about 5 per cent. is right. You can decide this for yourself, however, but for the sake of argument, let us say 5 per cent.

The next item to consider is your overhead. We hope the day has gone by when an electrical dealer thinks he hasn't any overhead. It is bad enough for an electrical contractor who does his business from his home to argue that way, but an electrical dealer cannot get away from the fact that his overhead is considerable. Estimates by various retailers place it at anywhere from 20 to 30 per cent. The Christmas trade should be a brisk one, but on the other hand it is going to cost a little more than ordinary in the way of publicity, breaking in green salesmen, and so on. Let us say, for the sake of argument, that the overhead is 25 per cent.

Now let us consider an article that sells for $100:

5 per cent. of this for profit....	$ 5.00
25 per cent. for overhead......	25.00
Total	$30.00

Therefore the cost of the article to give 5 per cent. profit and allow 25 per cent. overhead must be only $70.00. If the article you are selling has no resale price and no really fixed or established value on the market, you must work this out for yourself. But if the article has a fixed resale price, it is plainly necessary for the wholesaler to give the retailer 30 per cent. off the list price. These figures may not be applicable—and indeed cannot be applicable—to all stores, but no retailer should set out to dispose of his goods without considering very carefully the two items of profit and overhead. If the wholesaler or manufacturer is not disposed to give sufficient discount to allow the dealer to cover these items, it would be much better that he should refuse to stock such goods. There is no pleasure in doing business at a loss, even at Christmas time.

A final word:

A lot of extra money is always spent at Christmas. The dealer who is widest awake is going to get the biggest end of it. What will you have to report at 12 o'clock Christmas eve?

What the Electric Store Ha

A List So Varied, Attractive and Universally Utilitarian that the Wants of Every Man, Woman and Child are Readily Supplied. Electric Equipment is Attractive in Appearance, Helpful in Every Walk of Life, Appreciated by Young and Old, the

Electric Toys, Novelties and Decorations

Aerial Swing
Aeroplane
Animals, electric eyed
Automobile
Circuit breaker
Crane and hoist
Dynamo
Electric boat
Electric engine
Electric questioner
Electric range
Elevator
Electrically operated dog house
Experimental laboratory
Fan
Ferris wheel
"Fun" motor
Gas engine
Hydro-electric generator
Lamp post
Locomotive
Merry-go-round
Motor
Motor and Countershaft
Power station
Railway Outfit
Steam engine and dynamo
Telephone
Thriller magneto
Train
Transformer
Trolley car
Water power plant
Book on electricity
Electric top
Picture and Post Card Projector
Magic lantern
Motion picture machine
Shock coil
Battery
Battery lantern
Flashlight
Dark room lantern
Lantern attachment (battery)
Illuminated pads and pencils
Pistol flashlight
Bicycle lighting outfit
Canoe lamp
Electric candle
Christmas tree lighting outfit
Christmas tree lamp reflectors
Bird, fruit and nut lamps
Miniature incandescent lamps
Electric scarfpin
Battery fan
Battery motor
Chalk eraser cleaner
Corn popper
Horseshoe magnet
Magnet charger
Telegraph instrument
Wireless telegraph instruments
Tool kit
Baby flatiron
Nursery light

Electric Conveniences and Luxuries

Alarm clock
Battery lantern
Red lamp
Candlestick
Chair lamp
Chimes and Bells
Cigar lighter
Comb and curling ironer
Curling iron
Curling iron heater
Desk companion
Desk fan
Desk lamp
Electric fountain
Electric watch charm
Electrically lighted wall mirror
Electrically lighted table clock
Flashlight cane
Flashlight umbrella
Floral decorations
Flower basket
Foot warmer
Hair drier
Hair waver
Hand lantern
Heating pad
Illuminated pads and pencils
Illuminated table ornament
Library lamp
Luminous switch plate
Massage vibrator
Novelty electric candle
Oil lamp attachment
Ornamental bird cage
Ornamental fan stand
Ornamental pendant cluster
Perfumer
Piano lamp
Portable radiant heater
Reading lamp
Reed or wicker portable
Reminder clock
Shaving mirror
Shaving mug
Silk hat iron
Silk lamp shade
Talking machine motor
Talking machine record light
Traveler's iron
Traveler's Companion
Traveler's stove
Traveler's lamp, cord and plug
Vest pocket flashlight
Watch case flashlight
Writing desk lamp

o Offer Christmas Shoppers

Delight of Children, the Companion of Middle Age, the Comfort of Declining Years. Nowhere Else Can the Buyer Find so Great a Variety at Prices Which at the Same Time Give Real Value and Yet are Within the Reach of Everybody.

Electric Household Labor Saving Devices

Bell ringer
Bath heater
Boiler
Broiler
Cereal cooker
Casserole
Chafing dish
Chocolate and Cream warmer
Churn
Clothes drier
Clothes washer
Coffee mill
Coffee percolator
Coffee set
Combination cooker
Cook stove
Corn popper
Cream whipper
Dish washer
Disc stove
Disinfector
Drink mixer
Egg boiler, cooker or steamer
Egg set
Egg tester
Electrically heated faucet
Fan
Fireless cooker
Flat iron
Food carrier
Food warmer
Fruit juice extractor
Fruit and vegetable peeler
Frying pan
Fumigator
Gas lighter
Griddle
Grill
Hand lamp
Hot closet
Hot plate
Ice cream freezer
Illuminated porch number
Immersion electric heater
Ironing machine
Kitchen power unit
Lemon squeezer
Meat chopper
Meat slicer
Milk warmer
Plate warmer
Radiator
Rain alarm
Range or stove
Refrigerator
Regulating lamp or socket
Sauce pan
Serving table
Sewing machine motor
Sewing machine portable lamp
Stew pan
Sterilizer
Table cooking set
Table lamp
Tea ball pot, kettle or urn
Tea wagon, electrically fitted
Toaster
Toaster-stove
Utility motor
Vacuum cleaner
Waffle iron
Water purifier

Electric Fittings for the Automobile

Battery lamp
Clock
Foot warmer
Lamp kit
Lock
Signal bell
Signal lights
Trouble lamp
Cigar and pipe lighter
Electric horn
Electrically heated gloves
Engine and radiator heater
Garage and tire pumps
Garage portable lamp
Headlight dimmer
Headlight glare diffuser
Headlight voltage regulator
Hydrometer for battery testing
Inspection lamp and magnet
Limousine annunciator
Limousine cluster light
Limousine telephone
Limousine radiator
Pocket testing meter
Signal gloves
Spark plug
Spark plug intensifier
Spark plug tester
Steering wheel warmer
Spotlight
Storage battery
Storage battery tester
Vulcanizer

Electric Accessories for the Sick Room

Bath cabinet
Bed lamp
Body, joint and limb bakers
Candle or night light
Deodorizer
Ceiling clock
Electrically heated blanket
Electrically heated cap
Electrically heated garment
Electrically heated pillow
Foot warmer
Heating device
Heating pad
Mechanical exerciser
Medical battery
Medical coil
Medicator
Milk bottle or food warmer
Motor chair
Nurse signal
Obesity apparatus
Sterilizer
Therapeutic lamp
Treatment apparatus
Vibrator
Violet Ray apparatus

Troubles of the Electrical Dealer

Lack of Capital Stands First — How Best to Collect Outstanding Accounts

Whichever way one turns one finds the electrical dealer hampered for lack of the necessary capital. What is the cause of this? It does not seem to be true of the hardware man, or the druggist, or the grocer, or the butcher—at least not to the same extent.

There are probably various reasons, but, at the bottom of it all seems to be the fact that the man with the money to lend, that is, the banker, has not yet become convinced that electrical merchandising is a going concern, and that the electrical merchant knows his business. When the banker is satisfied that the man who opens an electrical store and comes to him for credit knows enough about the business to make a success of it there is no longer going to be any difficulty in getting the money Rightly or wrongly, therefore, the problem we are up against seems to be that we must convince the public in general and the banker in particular that this end of the electrical industry is being conducted properly.

Now the question arises, is the banker right or is he wrong? Is he justified in having his suspicions or is he merely a little too pernickety and over-cautious. There are exceptions, of course, but in the main there is only one answer that can be given to this question: the electrical dealer is not yet an expert merchandiser. He is coming, but he has not yet arrived.

The reason is not far to seek. Electrical dealers in the main are composed of two classes. They are, for example, men who have received their training in retailing other kinds of equipment. Take the hardware man. He knows hardware, but he does not know electrical goods. He is absolutely at sea when he begins to talk about them. He makes mistakes which injure rather than help the industry. Further than that, he is quite unlikely to be in sympathy with the industry,—it is merely a side line with him. In consequence, he is not a success as an electrical merchandiser. He is merely a makeshift, a something that fills the space until proper electrical merchandising shall have been developed.

Then there is the other kind, the man who has developed from a contractor to a dealer. He has no training as a merchandiser, and is about as much out of place in a store as he would be in a banking office.

There seems to be only one thing for it, therefore. We must school ourselves in the best methods of electrical merchandising. We must convince the community at large and the banker in particular that we have a prosperous business and that we know thoroughly well how to handle it, that the electrical store is as certain to make profits as the hardware store or the grocer. When we have established that point there will be comparatively little difficulty for any dealer to obtain the necessary money to establish himself in business, or to keep it going after he becomes established.

In the meantime, of course, the electrical dealer is greatly handicapped, and it is a great pity that some scheme similar to that practised by the Morris banks of the United States could not be evolved for Canada. If the industry were organized all over the Dominion it would be a step towards that end, because then it would show how really important a factor the merchandising of electrical goods has become. In the meantime, or until something of this nature can be worked out, it would seem that the manufacturers of electrical goods and the jobber should be willing to give to the retailer a somewhat greater measure of financial assistance.

An interesting letter comes in from a dealer in one of the most important towns in Manitoba. It is a "breezy" letter, and will interest our readers. The following are extracts:

"Merchandising — that's the guy we're after, and that covers some scope in the commercial world, and as you say, not used extensively in the electrical sphere. I am heart and soul for the betterment of the electrical trade in general. It is ours, and why not get it? We can if we go about it in the right way. Now what way?

"There are numerous ways, but I suppose what would work well in some places would be a total failure in others, but the principle must be nearly the same in all cases. I think co-operation is one step; good management another; and considerable capital would take a man a long way towards success. But branching from these there are so many side lines that tend to assist or retard success that a dealer should be constantly on the alert to keep everything going in the right direction.

"I will say your paper is certainly a great help in forwarding news of the trade, and also plans and suggestions on the merchandising end as well.

"There is one thing I would like to get to know, and that is the very best way to go about it to get in outstanding accounts. We have a considerable amount kicking around which I could use to very good advantage were it in the bank to my credit.

"I am very sincere, Mr. Editor, when I say that our biggest drawback is lack of capital. We have lots of business if we had the ready capital to go on with, but we have to turn down good business because of the lack of the goods, and as you say, the hardware man gets it, and he sure does."

Regarding the question of collecting outstanding accounts. Perhaps some reader would be good enough to offer some suggestions that have proven valuable in his own case. The most successful scheme is probably a series of well written letters, in which tact, sagacity, and firmness are combined in correct proportion. Start with the supposition that your customer is honest and means to pay. Give him all consideration that is reasonable, but finally, when you are convinced that he is not treating you fairly, go after him in earnest. Will some of our readers be good enough to supplement this suggestion.

The English Electric Co., Limited

The English Electric Company, Ltd., London, England, has recently opened offices in the Transportation Building, Montreal. This company is made up of the following concerns which were formerly separate: Dick, Kerr & Company, Limited, Preston, England; Coventry Ordnance Works, Coventry, England; Williams & Robinson, Rugby, England; Phoeneix Dynamo Mfg. Company, Limited, Bradford, England, and Siemens Bros. Dynamo Works, Limited, Stafford, England. Their output consists of steam turbines, Diesel oil engines, condensers, street railway equipment, and a full line of electrical apparatus, including a. c. and d. c. machines, rotary converters plant for rolling mills and mine hoists, transformers and switching equipment. On account of their recent purchase of the Siemens Works at Stafford, the English Electric Company will attend to the business in Canada formerly conducted by the Siemens Company of Canada, Limited. Mr. C. W. Stokes, the Canadian manager, who has recently returned from a seven months' business trip to England, reports that all their factories are well filled with orders both for the home market and for export.

Contract will be let for electrical work on $35,000 warehouse being built at corner Mincing and Wellington Streets, Toronto, by J. Henry Peters Co. Architect, E. J. Lennox, 164 Bay Street, Toronto.

Portable Electric Heaters Save Coal

Wherever surplus power is available, and more especially where it is developed by water-power, the present high cost of coal makes electric heating for early fall a most desirable arrangement. If we can postpone the firing of our furnaces three weeks or a month we shall have gone some considerable distance towards alleviating the coal situation. In the main, during the early autumn, there are only certain hours in the day and certain rooms in the house that need heating, and these can be attended to promptly and economically by one or other of the various types of heater on the market.

When we say promptly, we have in mind that an air heater will begin to affect the temperature of a room within one minute after the current is turned on, whereas a hot water or steam furnace does not give results for at best two or three hours. Then, again, the extra heat is probably only required for a short time. With the electric heater this is under absolute control, but with the furnace the heat continues to be delivered long after it is required.

Economically ,too, the electric heater has much more to commend it than it had in the days when coal was six or seven dollars a ton. In those days it was considered that the cost of heating a home would be three or four times as much with electricity as with coal, but now that the price of coal is two and a half to three times what it was, the discrepancy in cost is much less marked, and indeed has almost disappeared. In the very near future domestic electric heating will not be handicapped nearly so much by the cost of power as by the necessity for using all the power we have for other purposes. In the meantime, however, where power is available, electric heaters offer an almost ideal arrangement for the early months of the winter season.

No Speeches; Only an Evening of Fun

"No speeches, only an evening of fun," was the call that went out on Sept. 14th from the Harvey Hubbell Co. of Canada and the Crouse Hinds Co. of Canada to meet in the King Edward Hotel at 6.30 the following Friday evening. It goes without saying that the guests were "hand-picked"—just the jobbers who handle the lines of these two companies in Canada and, as a necessary leaven, a few good friends. Mr. Ed. Mack, manager of the two companies, himself a most genial host, had conceived the idea of this get-together evening so that his friends might have an opportunity of proving their own geniality—and it was a huge success.

Mr. L. B. Combes, office manager of Mr. Mack's companies was, next to his chief, particularly attentive to the welfare of his guests, but the whole staff spared no effort to make the evening an enjoyable and memorable one.

The staff included Messrs. Ed. Mack, managing director; Fred. W. Leavitt, sales manager; Harry R. Johns, stores manager; Frank R. Jeffrey, production manager; Leith B. Coombs, office manager; George P. Cairns and J. Brophy Burns, sales representatives; and Ralph A. Appell, assistant mechanical superintendent. A unique feature was the arrival of Miss Ida A. Ackerman, Mr. Mack's Manager of Accounts, to whom the various guests were introduced in turn, and who added her word of welcome and good cheer. The rather difficult task of making known to Miss Ackerman some outstanding good qualities of the various gentlemen as they were successively presented, fell to Mr. M. S. Pierce, and the fact that Mr. Pierce reached home safely that night is good evidence of the masterly manner in which he handled the task.

Other guests who enjoyed Mr. Mack's hospitality included the following: Mr. Harold S. Balhatchet, vice-president Benjamin Electric Mfg. Co. of Canada, Ltd.; Mr. John A. McKay, general secretary Canadian Electrical Supply Jobbers' Association; Mr. Walter Warren, president,, Mr. Milton S. Pierce, ,vice-president, and Mr Charles J. Bell, manager. Central Electric Supply Co., Ltd.; Mr. Harry Bayne, Supervisor of Metals, Dominion Government; Mr. Charles Duncan, manager, and Mr. Arthur E. Boyes, sales manager, Duncan Electrical Co., Ltd.; Mr. C. Austin McLean, vice-president, and Mr. Hamilton H. Gardiner, assistant manager, The Masco Co., Ltd; Mr. Gerald W. Barber, supply sales manager, McDonald & Willson, Ltd.; Mr. George Wight, president, and Mr. Howard W. Fairlie, sales manager of the Monarch Electric Co., Ltd.; Mr. L. Percival Stiles, district sales manager., Mr. W. Ross Ostrom, district manager, and Mr. Arthur L. Brown, district stores manager, Northern Electric Co., Ltd.; Mr. Joe Rogers, president, and Mr. J. Heber Rogers, secretary, Rogers Electric Co., Ltd.; Mr. Al. Jolson, Star in "Sinbad," Lee & J. J. Shubert, Inc., and Mr. Kenneth S. Zimmerman, manager, Zimmerman Advertising Service.

More events of this nature—no speeches, only an evening of fun—following Mr. Mack's conspicuously successful precedent, would be a very fine thing for the electrical industry.

There is Christmas Business "Aplenty" for the Electrical Contractor

Electrical contractors who are not also dealers may perhaps doubt that the Christmas season offers them very much in the way of extra business. The Christmas season does not generally bring more new buildings. There is one line, however, which it would appear the contractor may well follow up at Christmas time.

Our statistical department has been looking into the matter of the number of houses wired in the various cities and towns in Canada where electric current is available. Our information as yet is far from complete, but ample data is at hand to prove that a very large percentage of the houses that ought to be wired are not yet equipped with possibilities for using electrical appliances. For example, taking the list at random, a town of 7,500 reports that 85% of their houses are wired. Another town of 3,000 reports 60% wired. A village of 1,000 reports 30%.. A town of 5,000, 65%. Another small town only 20%, and so on. Only one report in a long list shows every house wired, and only one other more than 90%. The balance ranges all the way from 85% down to 30%.

Surely here is an opportunity for the electrical contractor to ingratiate himself with the man of the house and induce him to make his wife a Christmas present of the means of lighting the home and supplying it with electrical conveniences.

Traffic on the Toronto civic car lines continues to increase steadily. During the month of August there was a total of 2,625,583 passengers carried, as compared with 2,265,205 in August, 1919. The total revenue from passengers was $44,342.06, as compared with $38,048.89 in 1919.

The Value of Well Dressed Window

Attractive display of High Efficiency Lamp Co., Toronto. Mr Shaw is a strong believer in letting the public see his stock. This window was directly responsible for a good boost in sales.

The High Efficiency Lamp Co., 414 Yonge Street, Toronto, W. J. Shaw, manager, has made very definite attempts to have a well-dressed window. In a recent display the polished floor of the window was covered for the most part with loosely laid green velours, as were also three polished oak benches so arranged as to form steps. The back of the window was partitioned off from the store by a green curtain strung on a rod fixed between polished oak pillars. On the left hand side of the window were three glass shelves upon which were displayed toasters, percolaters, etc. Mr. Shaw believes this to have been one of the most valuable features of his window display. Across the front of the window near the floor was a row of lights shaded with yellow and orange colored covers. These gave a warm glow to the window display. Displayed in the window itself were fans, lamps, toasters, with just a suggestion of convenience plugs. Five ceiling fixtures were arranged on the ceiling of the window which also gave light to the display.

Two Very Attractive Exhibits at the Recent Canadian National Fair

By an oversight we failed to note in our last issue two of the most attractive exhibits at the Canadian National Exhibition. One of these was the exhibit of the Northern Electric Co., and the other of the Canadian Drill and Box Co.

Northern Electric Co.

The exhibit of the Northern Electric Co. in the Industrial Building, Canadian National Exhibition, showing their well-known telephone and fire alarm equipment, was fully up to the standard of previous years. The booth occupied a prominent position in the building, showing off the various instruments to the very best advantage, and as an advertising medium was equal to anything of a similar nature at the fair. The exhibit was in charge of Mr. F. A. Seeds.

Canadian Drill & Box Co.

The Canadian Drill & Box Co., in addition to their regular line, had three special features in their new panel box, their new power cabinet and their new motor starter. A feature of the panel box is that it is built on an economical basis, the parts being easily replaced. The motor starter was one of the most interesting features of the electric show. It is [illegible] and three phase [illegible]. The switch is a single throw knife blade type, with the running side arranged for fuses. It is impossible to throw the switch from the off to the running position without first being thrown into the starting position. If by chance the switch is placed at the starting position and left there it will automatically throw itself out. This starter is practically fool-proof, being equipped with safety guards over all live parts. When switch is in the off position protection is insured when replacing fuses. It is claimed to have unusual mechanical strength. The large, new power cabinet which was shown by this company was also admired by everybody in the electrical business. For neatness and compactness in construction it would be difficult to suggest improvements.

Obituary

Major F. C. Connery, assistant sales manager of the Canada Wire & Cable Co., died at the Toronto General Hospital on Saturday, 18th inst. Major Connery was a graduate of the Department of Applied Science and Engineering of the University of Toronto, and was at one time connected with the Toronto and Niagara Power Co., and later with the Hydro-Electric Power Commission of Ontario and the Pearson Engineering Works of New York. Prior to the war he was Lieutenant in the Q. O. R., and in 1915 went overseas with the 166th Battalion.

"Canada's Pioneers in Electrical Manufacture"

Under the above heading, a galaxy of electrical stars made their appearance in an attractive announcement on page 19 of our issue of September 15. In this announcement we featured photographs of no less than fourteen gentlemen prominent in the industry. In response to a number of personal inquiries of members of The Electrical News staff, we have pleasure in furnishing the following identification details:

The central figure of the group is Mr. R. J. Hiller, better known as "R. J." Mr. Hiller confesses to having been thirty-five years in the game, his connection dating back to the time of coal oil lamps. He is now manager of the Electrical Department of the International Machinery & Supply Company, Limited. Incidentally Mr. Hiller also confesses to being the greatest supporter of prohibition in the province of Quebec! (The note of exclamation is ours).

Mr. R. Moncel is president of the Devoe Electric Switch Company, Montreal; Mr. E. G. Mack is managing director and vice-president of Crouse-Hinds of Canada, Limited, Toronto, and of Harvey Hubbell Company of Canada, Limited, Toronto; Mr. Ross Clark is president of the National Conduit Company, Limited, Toronto; Mr. Charles Duncan is president of the Duncan Electrical Company, Limited, Montreal; Mr. H. S. Balhatchet is vice-president and general sales manager of the Benjamin Electric Manufacturing Company of Canada, Limited, Toronto; Mr. W. G. Harris is president of the Canada Metal Company, Limited, Toronto; Mr. D. R. Logan is manager of the Lamp Sales Section of the Canadian General Electric Company, Limited, Toronto; Mr. Herbert Hall is managing director of Conduits Limited, Toronto; Mr. Irving Smith is the electrical supply dealer, New Birks Building, Montreal, better known as "The Dessert Man"; Mr. G. M. Wight is general manager of the Monarch Electric Company, Limited, Montreal; Mr. W. J. Carrigan is vice-presient of Canadian Nathan's, Limited, Hamilton, Ont.; Mr. Chas. H. Keeling is general sales manager of the Square D Company, Walkerville, Ont.; Mr. H. S. Banfield is general sales manager of W. H. Banfield & Company, Toronto.

The personal element in this souvenir page of the International Machinery & Supply Company, Limited, makes the announcement of special interest. A limited number of reprints of this page are being distributed among the trade, and the above particulars may be helpful where identification is necessary although most of "The Men Who Dared and Won," are so well known to the industry that extended introduction is not required.

The Industrial Engineering Co.

Mr. R. G. Lee has resigned his position on the staff of the Toronto Hydro-electric System to become the general manager of the Industrial Engineering Company in Canada and the United States. Mr. Lee, during the past seven years, has been the power manager of the Toronto Hydro-electric System and is recognized as an authority in commercial engineering. During his tenure of office with Toronto Hydro he accumulated a great store of experience which The Industrial Engineering Company are very fortunate in securing. The company will have offices in Toronto and Windsor in Canada, and in Detroit, Cleveland and Buffalo in the United States. Their business will be divided into two departments; first, that of consulting engineering, and second, a department handling electrical apparatus and machinery. From the number of clients the company is enrolling it would appear that the public realize the great advantages that can be obtained from such a combination.

Mr. H. C. Bertram, also recently with the Toronto Hydro-electric System, has been appointed manager for the district of Toronto. Mr. Bertram's genial personality and ready wit have already gained him much credit in his new capacity.

The Benjamin Dimming Device

In a little item regarding the Benjamin Electric Co., which appeared in our last issue under the heading, "Electrical Display Held a Prominent Place at Canadian National Exhibition," one of the sentences was made to read: "Another feature was the darning device which is not only a great convenience, but a great money-saver as well to the consumer." This was a typographical error for "dimming" device. It would be a real boon to the housewife if the Benjamin company **would** bring out an electrical darning device, and we hope some clever inventor in the near future will make it possible for the Benjamin company to include this added convenience in their varied lines.

Mr. E. Warman, 209 Soudan Avenue, Toronto, has been awarded the contract for electrical work on branch of the Royal Bank of Canada being built at Coxwell & Small Streets,

The Canadian General Electric Company had an attractive booth at the Canadian National Fair. They exhibited a wide variety of electrical equipment—not forgetting the electric train for the kiddies

What is Newest in Electrical Equipment?

Suggestions for Christmas Stockings—A Real Electric Automobile for the Small Boy

It's not the easiest thing in the world to decide what stock to lay in for Christmas. Generally speaking it must be fairly small in size, reasonable in price, attractive in appearance and applicable to personal or home requirements. One special hold electrical appliances have on the public is their attractive appearance. In placing orders for the Christmas trade the dealer would be wise, we think, to keep this point prominently in mind.

A list of suitable presents is given in this issue for ready reference. There is nothing very original about it, but the value lies in that here we have all the possibilities grouped on one page. Without a list even the commonest items may, by chance, escape our notice. Such a list printed in fairly large type may well be displayed at strategic points in the store so that a customer may refer to it. There are hosts of people looking for suggestions. In addition to these we are running a number of illustrated items which may be helpful.

The Old Fashioned Christmas Tree

There is nothing that plays so big a part in the Christmas decorations as the old-fashioned Christmas tree, and when it is lighted up with electrics it is a delightful sight. The Canadian General Electric Co. recently developed an improved lighting set which they call the "Arberlux". One of the big troubles with the old type was that the lamps were wound in series and if anything happened to one of them all the others were rendered useless. This new set is wired in multiple so that if one bulb burns out or is broken the others are not affected. The whole outfit consists of a transformer which can be connected to a lighting socket and a 9½ ft. length of main cord with 20 branches made of twisted twin conductor, finished in green, which supplies twenty-one Mazda miniature lamps in ruby, blue, green, orange and frosted white glass. The transformer is equipped with three terminls for 10, 20 and 24 volts, so that it can be used for operating electric toys when not in use for lighting the tree.

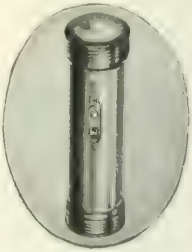
The Harvey Hubbell Company of Canada, Ltd., are distributing a folder describing the Hubbell Lamp Guard, which not only protects from accidents but makes theft impossible.

A Real Electric Automobile

This is a real car, though it may look like a toy, and would delight the heart of any boy or girl who may be fortunate enough to find one in his Christmas stocking. It is operated by storage batteries and a simple pressure of the right foot on a button placed under it sends the car forward, while a pressure of the left foot on a button placed under it reverses the car. When fully charged, this automobile has a range of ten miles at a speed varying from five to ten miles per hour. The dimensions of the car are: length 60 in., width 22 in., height 24 in. A hand lever on the right hand side controls the brake. The motor is of a special ball-bearing type, and the wheels have roller-bearings. Tires are solid 1 in. x 12 in. Two electric headlights and a tail lamp give illumination for night driving. No license required. It looks the most complete thing in the way of electric automobile toys that has ever been placed on the market.

You Can Always Find It

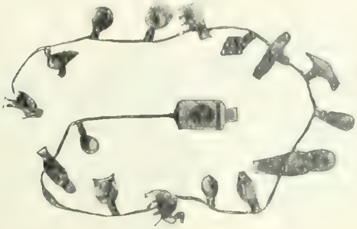
Flashlights are popular at all times and as essential as they are popular. At Christmas time there is no more attractive gift, and thousands upon thousands have been sold on account of their reasonable cost. A little feature which adds to the usefulness of the flashlight has been added by the United States Electric Mfg. Corp'n., in the form of a luminous button. The illustration shows one of these flashlights so equipped. The company advise that they are equipping a number of their regular flashlights with three luminous buttons so arranged that irrespective of the position in which the flashlight is placed at least one button is always visible. This is a feature that should be very popular as it is generally when other lights fail that a flashlight is required.



James Francoeur, electrician for a number of years with the Ottawa Electrical Company, has opened a retail electrical store at 21 Montreal Road, Eastview, Ontario. He will also do contracting.

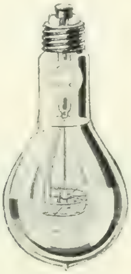
No Trouble With Tree Lighting

The Betts & Betts Corp'n, New York, manufacture an attractive Christmas tree toy outfit, as shown. The lamps are wired in multiple so that if one lamp goes out the others are not affected. The series includes 16 lamps of attractive design, specially calculated to interest and please the little ones. This outfit is operated off a small transformer, which may be attached to any lamp socket. The capacity of this outfit is one watt per lamp, or 16 watts in all.



A Lamp With Double Filament

The lamp shown herewith has been developed by the Whitelite Electric Co., 368 Broom Street, New York, and has been given the trade name of "Dualite," because it has two filaments. When one filament is burned out the second filament may be put in service. The lower filament is connected to the light with a cap screwed in at the base of the lamp, and when this filament has burned out the other filament is brought into the circuit by unscrewing the cap. It is claimed that the lamp does not discolor on account of special gas used in its construction.



Everybody Enjoys Electric Trains

If you want to attract the public to your window display set something in motion. The moving display is worth a half dozen "still" displays, however attractive they may be. One of the strongest attractions—and it has the advantage that it appeals to all ages—is the electric train. Whether he expects to sell them or not it will pay a dealer handsomely to install a train in his window and watch that it operates properly. Nor is there any reason why he should not sell them. With most boys who are given an opportunity of choosing their own presents the electric train is first choice.

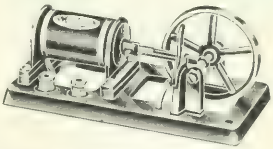
The train shown herewith is manufactured by the Lionel Corporation, 48B east 21st St., New York. Its operation is very simple, requiring only a small transformer which operates off the lighting circuit. In connection with this train the Lionel firm manufacture all sorts of station equipment, semaphores, station houses, bridges, platform signs, platform lamps, etc. It is a most attractive line for the Christmas trade.

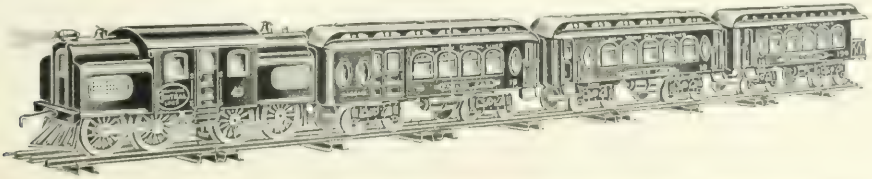
A Handsome Model Aeroplane

Everybody is interested in aeroplanes to-day, and the No. 18-W of the A. E. Rittenhouse Co., Honeoye Falls, N. Y., shown herewith, is a most beautiful model, patterned after one of the latest type machines. It is finished in khaki enamel, with red and gold trimmings, equipped with a motor, aluminum propeller, etc., and will operate on from four to eight dry cells, or on a small transformer. The machine is fitted with streamline struts and steel stay wires. Spread of planes 22 in., weight completely packed 11 lbs. As a window attraction this is one of the most popular toys a dealer could stock.

"Steam" Engine Run by Electricity

An electric motor in the form of a stationary horizontal steam engine, but operated by one or two dry cells, has been developed by the Martalex Mfg. Co., 450 East 148th Street, New York. It is claimed to be an improvement over the usual rotary motor for operating electrical toys. The speed and power of the engine are derived from the use of the iron-clad solenoid principle. A control lever varies the speed, starts, stops or reverses the flywheel. The cylinder cover is of planished steel, and the connecting rod and control lever

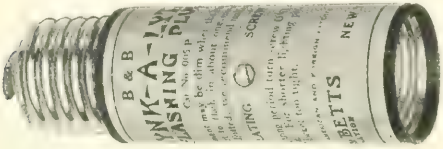




of fibre [illegible]. The finish is in black japan. The [illegible] is made in two sizes. The smaller type is [illegible] in. long by [illegible] in. wide and [illegible] in. high; it weighs [illegible] lbs., the fan wheel being 2 in. in diameter. The motor is illustrated herewith.

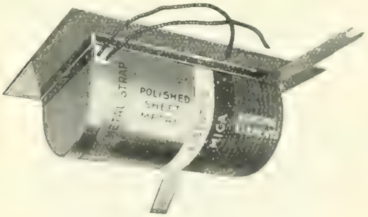
Attract Attention by Wynk-a-Lites

The Betts & Betts Corp'n., whose Christmas tree outfit is also illustrated in this issue, have an added feature in this connection, which they call the "Wynk-a-lite." The Wynk-a-lite is shown herewith, and is used to wink the lights used to decorate a Christmas tree on and off, thus adding very materially to the attractive appearance. As a window decoration an arrangement of two or three of these sets on the same tree or on different trees could scarcely be excelled. As a home attraction it should also prove a splendid seller at Christmas time as the cost is very low. The Betts & Betts Corporation are at 511 West 42nd St., New York.



Another Commercial Electric Appliance

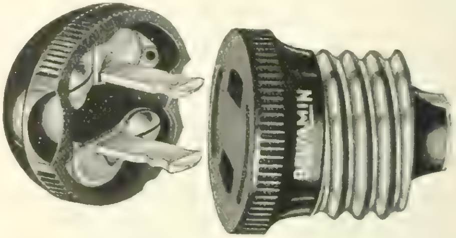
The Cutler-Hammer Mfg. Co., of Milwaukee, are now selling an electrically-heated chocolate warmer to be utilized in manufacturing chocolate coated candies. A big advantage of the electric heater is its accurate temperature control. The electric warmers are designed to permit of 3 degrees of heat, high, medium and low. The current consumption on low heat has been carefully determined on each size, so that it will just maintain the chocolate at the correct temperature for dipping. The current consumption of the chocolate warmer is very small, the quart size, on low heat, (which is the position used practically all the time), consumes only 55 watts or 440 watt hours in an eight-hour day. At one cent a kilowatt this is less than half a cent for current cost. It is claimed that the heater will not deteriorate with age. Another feature is the flexibility of the arrangement made possible by each warmer being a separate unit.



The Wagner Electric Manufacturing Company, of Saint Louis, announces the removal of its Salt Lake City office to 59 West Broadway, and the opening of a service station at the same address. Mr. L. Brandenburger will continue in charge as branch manager.

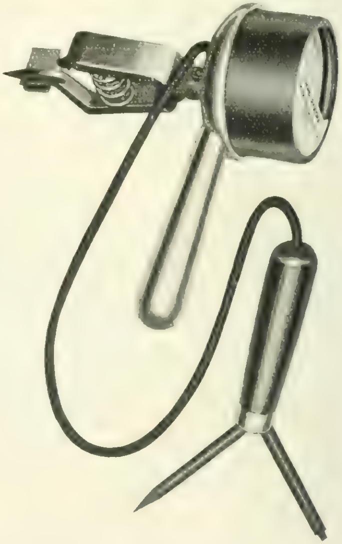
Connector With Adjustable Blade

A convertible cap for separable attachment plugs of the parallel, tandem and double T and I-T types of receptacles is being placed on the market by the Benjamin Electric Mfg. Company. Either of the two brass blades of the cap may be turned by the fingers through an angle of 90 deg., thus allowing the cap to fit almost any base board or wall receptacle. The cap is made of a heat-resisting molded composition and has two finger grips and milled edges to facilitate removal.



The Cadmo Volt Reader

This illustration shows the Cadmo volt reader for use with storage batteries. The principal uses for this reader are: voltage testing of cells on charge or discharge; carmium test to accurately determine the state of charge of either or both groups of positive and negative plants; polarity test to insure proper assembly and direction of charging current. A cadmium test of storage batteries is the only method of determining which group of plates fails to give capacity, or to become charged, and will locate defects such as lack of porosity in the active material not evidenced by inspecting the plates. This instrument is called the Hy-[illegible] Cadmium Volt Reader and is manufactured by the Service Station Supply Co of Detroit.



CADMIUM-COPPER WIRE

—— THE WIRE FOR WEAR ——

During the War the whole of our output of Cadmium-Copper Wire was taken by the European Governments for War purposes.

We are now once more in a position to supply the requirements of our customers for this well-known wire in all sizes for Trolley Wire, Transmission Lines, Telegraph Wire, &c.

CONDUCTIVITY	7% TO 10% LESS	THAN HARD DRAWN COPPER
TENSILE STRENGTH	**10% TO 75% GREATER**	

According to size of wire.

As an Asset Cadmium-Copper has the same Scrap Value as Electrolytic Copper.

TROLLEY WIRE

is manufactured by us in

ROUND,
GROOVED,
NON-FOULING,
SPECIAL SECTIONS

and has been supplied by us to the principal Street Railway Systems of the Dominion. The following Report was received by us from the Superintendent of one of the largest systems:—

> "On May 8th, 1919, we strung the outside curve with a sample of this wire. The opposite curve in the same direction had been strung with ordinary trolley wire a very short time previous.
>
> "On December 21st both curves were measured with a micrometer. This would give each curve 228 days' service, and taking 365 mils as the diameter of a 2/0 wire, we found that the maximum wear at any point on the cadmium wire was 20 mils, while the maximum wear at any one point on the ordinary copper wire was 60 mils. The average wear on the cadmium wire was 5 mils, and on the copper wire about 20 mils.
>
> "At the above rate of wear the cadmium curve should last **between two and three times longer** than the other curve."

SERVICE COUNTS

Eugene F. Phillips Electrical Works, Limited

ESTABLISHED 1889

Head Office and Factories - MONTREAL

Current News and Notes

Bridgewater, N. S.

Messrs. Russell & MacAulay, 10 Walker Street, Bridgewater, who have been appointed general contractors for the $20,000 branch of the Royal Bank of Canada being built at Bridgewater, will let contract for electrical work.

Brockville, Ont.

Messrs. A. G. Dobbie & Co., Brockville, Ont., have been awarded the contract for electrical work on $40,000 college being built on Perth Street, by the Standard Church of America.

Buckingham, P. Q.

Contract will be let for electrical work on $200,000 Roman Catholic church being built at Buckingham. Architect, Viau & Venne, 76 St. Gabriel Street, Montreal.

Halifax, N. S.

Mr. H. E. Redmond, 65 Chebucto Road, Halifax, has been awarded the contract for electrical work on twenty residences being built by the Halifax Housing Commission.

Halifax, N. S.

Contract will be let for electrical work on $40,000 synagogue being built on Robie Street, by Baron de Herch Society. Architect, A. R. Cobb, Canada Mortgage Bldg., Barrington Street, Halifax.

Hamilton, Ont.

The Canada Electric Co., 175 King Street East, Toronto, have been awarded the contract for electrical work on $350,000 Pantages theatre being built on King Street, Hamilton, Ont.

London, Ont.

Messrs. Western Ontario Electric Co., 237 Dundas Street, London, Ont., have been awarded the contract for electrical work on $70,000 school being built at Ealing, by the Board of Education.

Moncton, N. B.

Contract will be let for electrical work on $200,000 theatre being built in Moncton, N.B., by the Eastern Amusement Co. Architect, R. A. Frechette, 30 Bonnacord Street, Moncton.

Montcerf, P. Q.

C. H. Gravelle, 38 Laval Street, Hull, has been awarded a contract for the installation of a 100 light Laval generator, with storage battery, for E. Nault of Montcerf, Que.

The National Electric Heating Co. have found their business expanding so rapidly that their present quarters at [illegible] Queen Street East are inadequate. They have now engaged additional floor space in the Wrigley building. It is understood that their entire range manufacturing business will be transferred to the new location.

Moncton, N. B.

The Atlantic Underwear Co., Ltd., Moncton, N.B., are building a $40,000 boarding house in connection with their factory, and will be in the market shortly for electric lighting fixtures.

Moncton, N. B.

Messrs. Thos. Johnston Co., Ltd., 736 Main Street, Moncton, have been awarded the contract for electrical work on $100,000 hotel being built by the Brunswick Hotel Ltd., Main and Highfield Streets, Moncton, N.B.

Montreal, P. Q.

Mr. N. Penny, 32 Gallery Square, Montreal, has been awared the contract for electrical work on $12,000 stables being built on Papineau Avenue, by Borden's Farm Products, Ltd.

Montreal West, P. Q.

Mr. Fred. J. Smith, 472 Prudehomme Avenue, Montreal, has been awarded the contract for electrical work on branch of Royal Bank of Canada being built at Westminster and Milner Avenues, Montreal West.

Ottawa, Ont.

Mr. Stanley Lewis, Metcalfe Street, Ottawa, has been awarded the contract for electrical work on $40,000 fire station being built at Sunnyside and Fairbairne Avenues, Ottawa.

Mr. H. L. Allen, 272 Bank Street, Ottawa, has been awarded the contract for electrical work on $130,000 addition to public school being built on 5th Avenue, Ottawa.

Contract will be let for electrical work on $500,000 school being built by the Public School Board at Chapel and York Streets, Ottawa. Architect and Superintendent of Buildings, W. C. Beattie, Elgin Street, Ottawa.

St. Catharines, Ont.

Messrs. Martin Electric Co., 9 St. Paul Street, St. Catharines, have been awarded the contract for electrical work on orphanage and school being built on Yate Street, by the Order of Carmelite Sisters.

Sudbury, Ont.

Mr. A. Parent, 4 Carleton Street, Sudbury, has been awarded the contract for electrical work on $24,000 addition to the Municipal building.

BARGAIN

FOR SALE—Approximately 20,000 Fleischmann's Arc Lamp Carbons cored and solid ½ in. dia. About 40,000 Single Wire Cleats, and 12 Double Pole Switchboard Type Oil Switches, 2000 volt, 50 amperes.

WE WILL SELL CHEAP.
MAKE AN OFFER.

International Electric Co., Ltd.
97 Bleury St. - MONTREAL
Telephones Main 149-3101

ALLEN FLUX
NON-ACID—FOR SODERING

WHY
should you see this name standing right out before you whenever you think of
FLUX
There can be but one answer and that is it is the
BEST
Want to soder aluminum? That's easy.

at it since '93

BISSETT & WEBB
Limited
126 Lombard St., WINNIPEG, Can.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MacLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 296 Broadway
CHICAGO - - Room 803, 63 E. Adams St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, October 15, 1920 No. 20

Canadian Engineering Standards Association Showing Results

It will be recalled that last year there was formed what is known as the Canadian Engineering Standards' Association, having for its object the performance of functions similar to those of the British Engineering Standards' Association which has proved of great value to British industries. Though the Canadian association has a Dominion charter, and is recognized by the Canadian Government, it is not a government institution. Its members are nominated by such bodies as the Canadian Manufacturers' Association, the Canadian Electrical Association, the Canadian Mining Institute, the Engineering Institute of Canada, etc., men who are qualified by their technical and industrial standing to represent these various interests, and who serve gratuitously. The association is supported by contributions from the various technical and industrial societies interested, and from individual firms, which contributions are supplemented by a grant from the Dominion Government.

Individuals or firms are free to make any suggestions regarding the formation or revision of any Canadian standard. The association thereupon confers with the various interests likely to be affected by the establishment of such a standard, and a sub-committee is named to consider the matter, this committee being composed of representatives of the producers and users of the standard in question, together with such technical advisers as may be thought desirable. If this committee, having investigated the conditions thoroughly, recommends the adoption or modification of the standard, its findings are reviewed by the main committee of the association which must be thoroughly satisfied before it authorises publication.

The Canadian Engineering Standards' Association will not undertake tests, but will work in close collaboration with the Bureau of Standards which it is suggested should be formed as part of the proposed Research Institute. The Standards' Association will undertake to formulate a standard specification or set of dimensions, but it will be left to the Bureau of Standards to determine whether or not a given product complies with the required conditions. It will thus be seen how necessary it is that such a bureau should be established in the very near future.

The purely electrical organizations represented on the association are the Canadian Electrical Association and the Hydro-electric Power Commission of Ontario, whose representatives respectively are A. A. Dion and F. A. Gaby. Certain work is in progress by an electrical section committee of which Dr. L. A. Herdt, McGill University, is chairman; a sub-committee on incandescent lamps, John Murphy, Ottawa, chairman; a sub-committee on transformers, A. A. Dion, Ottawa, chairman; a sub-committee on telegraph and telephone wire; W. J. Duckworth, G.N.W. Telegraph Co., Toronto, chairman, and a special committee to confer with British delegates regarding electrical fittings, of which committee E. G. Burr, consulting engineer, Montreal, is chairman.

The honor of presenting the first report, which is just to hand, falls to P. B. Motley, chairman of the sub-committee on Steel Railway Bridges. The publication is entitled "C.E.S.A. Standard Specifications for Steel Railway Bridges."

Power Shortage in Niagara District a Difficult Problem

What the next two months will show in the way of power shortage in the Niagara district is difficult to predict. There is one possible chance, namely, that the slowing up in industries, which is undoubtedly in evidence, may so reduce the demand for electric energy in that direction as to offset the necessarily increased lighting and heating load. It is believed there is some sign of this already. However, the Ontario Hydro Commission are looking for a shortage and a number of plans for meeting the situation are being considered. It has been suggested that in-as-much as the household customer has not yet been called upon to contribute anything in the way of increased rates, it would be nothing more than fair that in this case he should temporarily be asked to make some measure of sacrifice. One way to limit the maximum would be to charge the household customer a high rate for everything used in excess of a pre-determined amount. This would probably have the desired effect, though whether it is the best course to pursue does not seem to be entirely evident.

It is axiomatic that the very first thing to be considered is the possibility of obtaining a further supply of power. There is some 25,000 horsepower capacity installed in one power plant at Niagara Falls which is not being used because the charter rights do not allow taking more than a certain fixed number of c.f.c. out of the river. There is a considerable amount of generating power on the Canadian side, and rightly belonging to Canadians, which is being exported under contract to the United States. There are certain isolated steam plants at various points in the Niagara district, one of them capable of generating at peak load somewhere around 25,000 horsepower, which are not being utilized. There is an old saying that "necessity know-no law," and surely if it is true in any case it is true now in Ontario under the present condition of power shortage which is holding up our industrial development. Has everything been done that could be done to obtain this power for the people, and whose fault is it that this power remains idle while our industries languish? The people are suffering as a result of this condition. Have the people not a right to know the reason?

The power shortage has certainly placed the electrical industry in an anomalous position. Manufacturers, wholesalers, central stations, contractors, retailers and the technical press have strained every nerve to educate the people of Ontario to use electrical appliances—electrical energy in the form of light and power in the factory, office and home—and now when we seem to have reached a point which is within sight of the goal we have been striving for, and the general public are beginning to appreciate and demand the very thing that we have told them for so many years they are in greatest need of—just when that moment begins to arrive we turn around and say, "you can't have it; if you insist in doing what we have all urged you to do, we'll fine you."

Whatever else it may do the situation will certainly raise the question in the people's mind as to whether the electrical industry after all is not something of a derelict, blown about hither and thither without a helmsman or a rudder or any directing power. If we once get this idea in their mind by discouraging them from using electric energy, it will be harder than ever to get them in sympathy with it again.

There is no use talking about what might have been or what should have been done. Ontario is hit hard by the power shortage, and the consequences that threaten are alarming in prospect. Would it not be better to do something rash and extravagant in the way of supplying the need—something arbitrary perhaps, so long as it is fair—so that the Province may not be set back a decade industrially?

Forming Quebec Co-operative Electrical Association

The formation of a Quebec Co-Operative Electrical Association is the object of a two-day convention to be held in Montreal, Oct. 19-20.

This association will act as a parent body to the various other electrical organizations now in operation in Montreal, and will consist of central station manufacturers, jobbers, and contractor-dealers. The following is a list of the different committees and members in charge of the arrangements for the convention.

General committee: Messrs. M. K. Pike, Northern Electric Co., Ltd., chairman; F. J. Parsons, McDonald & Willson; W. O'Brien, Montreal Light Heat & Power Co., Ltd.; L. Grant, Eugene F. Phillips Electrical Works, Ltd.; J. M. Robertson, consulting engineer; J. W. Pilcher, Canadian General Electric Co., Ltd., and S. W. Smith, Electrical Equipment Co., Ltd.

Lunch committee: Messrs. S. W. Smith, chairman; R. Moncel, Devoe Electric Switch Co., Ltd.; N. Simoneau, contractor-dealer, and R. L. Jones, Canadian General Electric Co., Ltd.

Smoker committee: Messrs. F. J. Parsons, cairman; N. S. Ricards, Nortern Electric Co., Ltd.; R. J. Hiller, Inter national Macinery & Supply Co., Ltd., and R. L. Jones.

Finance and advertising committee. Messrs. M. K. Pike, chairman; R. J. Beaumont, Shawinigan Water & Power Co., Ltd.; L. C. Haskell, Southern Canada Power Co., Ltd.; W. O'Brien, J. Pilcher, Canadian General Electric Co., Ltd.; R. Moncel, J. Burns, Munderloh Electrical Company, Ltd., and A. E. Boyes, Duncan Electric Co., Ltd.

The prŏgramme of the convention is as follows:

Tuesday, October 19th.

12.30 p. m.—Luncheon, Windsor Hotel; addresses.

3.00 p. m.—Meeting of the various sections of the Montreal Electrical Association.

Tuesday evening.—Conferences.

Wednesday, October 20th.

12.30 p. m.—Montreal Weekly Electrical Lunch at Freeman's Hotel.

8.00 p. m.—Smoker.

The Electric Club of Toronto Opened Season on Oct. 1st.

The first luncheon meeting for the autumn season of the Electric Club of Toronto was held on October 1st. The meetings are again being held in the Hotel Mossop, on Fridays, at the luncheon period. Mr. H. H. Couzens, general manager of the Toronto Hydro and of the Toronto Transportation Commission, was the speaker and, as expected, proved a most popular attraction, as the attendance was one of the largest in the history of the club. Mr. Couzens had just returned from a brief holiday in England, and gave the members a breezy review of general conditions in the Old Land. Mr. Geo. D. Perry, the new president of the club, occupied the chair.

At the second Friday's luncheon, Mr. W. G. Gordon, railway and traction engineer with the Canadian General Electric Company, gave a most acceptable talk on railway electrification. At this meeting Mr. Frank Kennedy, vice-president, did the honors.

Mr. Gordon emphasized a number of important economies possible with electric operation, among them being a saving of 12% of the total ton miles which could be applied to revenue producing haulage. This saving is effected by the elimination of the haulage of tenders and locomotive coal, and by a reduction in locomotive ton-miles due to the fact that a greater percentage of the total weight can be used on the drivers of an electric locomotive than can be used with the steam locomotive. Where water power is available the total coal consumption is, of course, conserved.

It takes 13¾ lbs of coal burned in a locomotive fire box to develop one kw. hour at the driver rims. Allowing 55% efficiency between the incoming high tension line at a substation and the driver rims of an electric locomotive, one kw. hour at the former point is equal to 7.6 lbs. of coal burned in the locomotive This 55% efficiency takes into account the losses in the step down transformers, the motor-generator sets, the overhead trolley network and ground return and the rheostats and motors on the locomotive. With central stations delivering energy at the substations at a cost of 2.5 lbs. of coal per kw. hour this means a saving of two-thirds of the coal used in steam operation.

The cost of maintenance of a steam locomotive is three times that of an electric locomotive for the same train tonnage handled.

The latest figures for the C.M. & St. P. show 35 watt hours per ton mile for freight service and 40 watt hours per ton mile for passenger service measured at the incoming high tension lines.

One of the most important factors in ensuring continuity of operation is the high speed negative circuit breaker as developed by the General Electric Company. This circuit breaker opens so rapidly that the generators do not have a chance to flash over due to extremely heavy overloads or short circuits, as it breaks the circuit before a commutator bar can pass from brushes of one polarity to the next brushes of the opposite polarity. An oscillogram was shown where the time of opening was only seven-thousandths of a second.

Control apparatus for automatic substations has been developed to such a point of perfection that there is now no difficulty in applying automatic control to railway motor-generator sets of 2,000 or 3,000 kw. capacity and up to 3,000 volts d.c. This will result in reduced operating costs, as a large percentage of substation operators can be dispensed with who would be required with non-automatic control. The substation comes into operation when the line voltage drops to a predetermined point and shuts down when no longer called on for load, repeating this cycle indefinitely and automatically.

The power limiting system developed on the C.M. & St. P. means a very decided saving for the railway company in keeping down the power peaks on which their monthly payment is based. The despatcher has this under his control and can drop the voltage over the system by introducing resistance in the shunt fields of the generators. A reduction of from 20% to 25% in the power peaks can be made with this power limiting system without interfering with schedules.

Armstrong-Whitworth Will Manufacture Turbines for Canada

It used to be a complaint in Canada that British manufacturers did not take sufficient interest in the Canadian market, though a distinct change was noticeable during the years immediately previous to 1914 when many good contracts went to British firms, and several British firms established offices in the Dominion. During the war the natural tendency was to withdraw from colonial trade on account of the difficulties of supplying even sufficient equipment for the home market. After two years of peace, however, it is natural that some of the larger firms in the mother country should have so far re-established themselves that they are now prepared to look to the colonies again.

One of the first evidences of this movement is seen in the announcement that the well known Elswick firm of Messrs. Sir W. G. Armstrong Whitworth Co., Ltd., have decided to take up the manufacture of water turbines and will enter the Canadian field immediately. The personnel of this firm are no strangers to hydraulic engineering, as they have engaged in such work since 1847, and although water power engineering may come under a different category, there is little doubt that there are many problems connected with marine propellers which may be solved by the lessons learned from water power engineering and vice versa.

For the designs of their turbines Messrs. Armstrongs are availing themselves of the assistance of Messrs. Jensen & Dahl of Kristiana, Norway, who in this country are better known as the makers of pulpwood machinery. Their reputation is well established in England, however, as manufacturers of both the Francis and Pelton type of turbines, the demands in Norway having absorbed the greater part of their output in this direction, in units varying in size from 3,000 to 16,500 h.p. At the moment a unit of 16,000 B.h.p. is under construction for the Vamma Power Co., and five double runner Pelton wheels of 15,000 h.p. capacity for building into the existing turbines in the Rjukan plant.

It is gratifying to feel that Canada's wonderful possibilities in water-power development are so well realized in the old country as to induce such an old established firm as this to cater for our business. We hope the advent of this company in the Canadian field may be the means of stimulating our water power development to still greater activities.

An Electric Cooking School Attended by Hundreds of Housewives

A cooking school, served entirely with electricity, and featuring practically all the modern uses of electricity in the home, was conducted in Salt Lake City from August 2nd to 7th inclusive by the Salt Lake Telegram, in conjunction with the Utah Power & Light Company, all the other leading elecrical concerns of the city, and various merchants and manufacturers of food products. The Journal of Electricity gives the following data:

Miss Edith Clift, of Chicago, a domestic science expert, conducted all of the cooking demonstrations, which were given from 2 to 3.30 p.m. every day, preceded by a musical program from 1.30 to 2 p.m. Miss Clift gave demonstrations in the preparation of practically every kind of food. She took up every branch of the culinary art, and showed the use of all kinds of materials and cooking appliances.

Entirely different demonstrations were presented each afternoon, and the course concluded with a special bread, pie and cake baking contest, in which hundreds of dollars' worth of prizes were distributed.

An amazing array of electrical appliances, some of which had never been shown before in the city, were on exhibition, to demonstrate to the housewives the modern way of avoiding household drudgery.

Cooking contests were held each day, for which valuable prizes were given, the prizes consisting of various electrical appliances contributed by electrical firms of the city, and various articles of merchandise contributed by the merchants and manufacturing firms. These daily contests, in which a large number of housewives participated, were in the making and baking of bread, various kinds of cake, doughnuts, etc.; and a grand sweepstake prize of one electric range was given for the best individual loaf of bread.

Another contest which attracted considerable interest was one in which a large pile of two, three and four way attachment plugs was placed on a table, and the contestants were required to make guesses as to the total number of appliances which would be operated by these plugs.

One of the main features was a wedding which took place at the cooking school, the happy newlyweds receiving as a present an electric hope chest, which contained practically everything in the way of thoroughly up-to-the-minute work-destroying electrical appliances. Here is what was in it: electric range, washing machine, vacuum cleaner, five table lamps, five cartons of Mazda lamps, vibrator, curling iron, toaster, iron, household motor, chafing dish, heater, milk warmer and warming pad. These were contributed by various electrical firms.

There were hundreds of interesting and attractive exhibits, representing not only the electrical industry, but the products of the various manufacturers and merchants of the city.

Electricity was, of course, the feature, and the hundreds of housewives who attended the school were thoroughly convinced that the more extended use of electricity in the home would solve most of the housework problems with which they have been confronted—that the harnessing of electricity to the work of washing, cleaning, ironing, cooking, etc., would be the real solution.

The cooking school is an annual affair and each one is better than the last. The one just closed was undoubtedly the best attended and most successful yet held, and more interest than ever was shown in the application of electricity as an efficient time and energy saver in the home.

The High Cost of Poor Lighting

Here is the Correct Viewpoint — Too Often we Speak of the Cost of Good Lighting When in Fact it is An Economy Rather Than An Expense — The Dividends From Correct Illumination are so Big That No Industry Can Afford to Ignore Them

By R E Simpson*

When a factory owner receives a bill from the gas or electric company, he feels that he has at least one definite item on which to base his overhead costs. Moreover, he doubtless notes with satisfaction that there has been little if any increase in the service rates during the last five years, and is duly thankful that in this age of high cost of everything, the prices of the gas and electricity that are necessary in his business have remained somewhere near the pre-war level. A closer analysis of the various factors entering into the overhead cost of production may disclose, however, that owing to circumstances that are entirely within his control, he is not getting an adequate return for the money expended. A manufacturer should not be satisfied with his illumination, nor can he definitely ascertain the correct charge for that illumination, until he has proved conclusively that it is impracticable to increase the productive capacity of his plant, or to decrease the percentage of spoilage, the damage to apparatus, the intentional lost time, and the accident rate, by varying the intensity levels or making other changes in his lighting system.

It is not the purpose to discuss all these factors, at this time. At present our attention is to be directed to the last item,—namely to the influence of lighting upon the accident rate, and the consequent bearing of the accident rate upon the lighting bill.

It has been definitely established that ten years ago approximately 24 per cent. of our industrial accidents were caused by poor lighting. In the intervening decade much progress has been made in the art of illumination and in promoting the safety of workers, with the result that this percentage has been considerably reduced. The safety-first idea was brought forth, and its influence is now evident over the entire country. This safety movement has wrought such a change in the physical safeguarding of industrial hazards that whereas ten years ago accidents occurred in thousands of places where neither guards nor lights were provided, to-day most of these places are guarded so that the presence or absence of light has a relatively small bearing. The last ten years have seen marked progress in the development and use of artificial light-sources, greater attention given to the design and construction of factory buildings in order to secure a maximum amount of natural light, and the gradual introduction of factory lighting codes. The general dissemination of information on lighting questions by various interested organizations during this period has also produced benefical results, and the larger insurance carriers have played a by no means unimportant part in this work, because a successful compensation insurance carrier must continually study the causes of accidents and devise methods for preventing them. As preventive measures are evolved, the insurance carriers take steps to see that these are adopted and put in force by their policy holders, so that in the lighting field the insurance companies are continually doing missionary work.

[illegible] reports for the past year, such as was made for the year 1910, has not been made; but a rather limited observation of reports, coupled with personal investigation and study, leads to the conclusion that at the present time approximately 15 per cent. of our industrial accidents may be attributed to improper illumination. Even a cursory study of the subject will reveal the fact that of late years only a minor percentage of what we may term lighting accidents are due to insufficient illumination. We find, instead, that accidents that may be charged to faulty illumination are mostly caused (1) by continued eye-strain with its general detrimental effect on our physical well-being (and this is recognized as a distinct moral hazard), (2) by sporadic but more acute eye-strain, and (3) by glare,—all brought about by improper use of light-sources. From this we may fairly conclude that the increase in the knowledge of the general public concerning proper illumination has by no means kept pace with the development of the art. It is highly desirable, therefore, to pay greater and more specific attention to the problem of the proper use of light-sources, as well as to the question of raising intensity standards.

If we admit that 15 per cent. of our industrial accidents are due to the misuse of light-sources, what does this represent in financial and economic loss? If we knew definitely the number and nature of the accidents that occur each year, and also their cost, a simple calculation would give us, in dollars, the total loss chargeable to poor lighting. Unfortunately there is no central agency for getting data of this kind, so that we must pick up our information here and there, piecemeal, from reports of various bodies such as State Labor Department, Industrial Commissions, and insurance companies. Compilations from these different sources are likely to contain duplications, and there will surely be important omissions. Bearing this in mind, however, we shall find that there is a fairly close agreement among various investigators to the effect that there are each year more than two million non-fatal industrial accidents causing loss of time. According to the standard accident-severity table, 95 per cent. of these accidents would be classed as temporary total-disability cases, causing an average time loss equivalent to two and one-half weeks per accident. One-tenth of one per cent. would be classed as permanent total-disability cases, with an equivalent time loss of 850 weeks per accident. The remainder would be considered permanent partial disability cases, with equivalent time loss of 190 weeks per accident. Conservative estimates of fatal accidents place the number at 25,000 annually, with an equivalent time loss in excess of 850 weeks per accident.

This is hardly the place or time for giving a detailed explanation of the constants that are here employed in connection with accident statistics. It might be well to say, however, that for the purpose of facilating calculations of this sort, in which injuries of several types are involved, it is customary to reduce all the data to a single basis,—and it is most convenient to adopt, as this basis, the loss of time that would be financially equivalent to each type of casualty. We say, for example, that a fatal accident is equivalent, on an average, to a time loss of 850 weeks,—meaning thereby that the total cost, in money, would be the same, whether the man lost 850 weeks or were killed. And please note that the significance of these figures lies in the fact that they represent sums of money that must be paid out, in some way or other,—indirectly if not directly,—and mainly by the employer.

---

* [illegible] 1917

Loss Runs Into Large Figures.

Our conception of the total economic loss that the foregoing figures involve will depend largely upon the unit-costs with which they are associated. If we conservatively estimate $20 as the average weekly wage, and assume that $20 per week are needed in addition to cover medical attendance, hospital charges, loss in production, insurance, and the various other items that enter into the cost of an accident, we find the total annual cost, in round figures, approximates $2,000,000,000—the part chargeable to poor lighting, therefore being about $300,0000,000. This is a sum in excess of our yearly industrial-lighting bill, and hence we see that the misuse and inadequate use of lighting facilities in industry cost more than the light itself.

Although we are accustomed to-day to think and talk in millions and billions, most of us can still grasp the essentials of a discussion based upon hundreds and thousands. It may be of interest, therefore, to consider the lighting bill as rendered by the utility company to a typical plant, and see how this bill is affected by the accident-factor. To do this, we must make certain assumptions, but these can be realized in fact in any industrial centre. The factory, we will say, has 1,000 employees earning an average of $40 per week each, the annual payroll therefore being $2,080,000. An average of 100 watts for lighting is allowed for each workman, but there are many faults in the installation,—such as lack of reflectors, poor distribution, glare and specular reflection. Assuming that the lamps are burned three hours per day, during a year of 300 working-days, and that a rate of five cents per kilowatt hour is charged, the lighting bill will be $4,500 per year, or an average of $375 per month.

Compensation insurance premiums are based on the amount of the payroll, and the rate is determined by the accident experience of a given industry, modified by the experience of the particular plant under consideration. With a rate of one per cent. the premium in the case under consideration would be $20,800. The insurance carrier might pay the claims resulting from two accidents per month (on an average), and meet their own overhead costs, and still have a light margin of profit. An experience of three accidents per month, one-third of them due to poor lighting (a not unlikely event), would leave the insurance carrier no option but to increase the rate by 50 per cent. The premium would then be $31,200,—an increase of $10,400, or an average of $866 per month. We see, then, that the factory owner, in this example, is paying the utility company $375 per month for illumination, and the insurance carrier $866 per month (or nearly two and one-half times as much), because that illumination is not sufficient to permit his employees to work in safety. The cost of his illumination is therefore increased to $1,241 per month on account of this one item.

Manifestly this is not a happy condition for any of the parties concerned. As a representative of an insurance carrier, I can say with good grace that we sincerely desire to prevent accidents,—and in fact this is an important part of our business. The triple purpose actuating this work is (1) to reduce accident claims, thereby (2) reducing the premiums, and (3) reducing suffering.

This $866 per month does not serve a progressive purpose. At best it merely assists in restoring that which our misuse of a modern convenience has damaged,—that is to say, an injured worker. If part or all of this sum could be devoted to eliminating the cause of the accidents by improving the illumination, the workmen would be benefitted through the safer working conditions, the owner would be reasonably certain to increase his production, decrease his spoilage, and have a steady working force, the central station would increase its revenue, and the insurance carrier would not be under the necessity of increasing its premium rate.

A paper presented at the last convention by Mr. R. O. Eastman gives information which suggests a line of action calculated to materially improve our industrial lighting. Mr. Eastman reports that a majority of the executives interviewed during the course of his investigation had little or no conception of what constitutes good lighting. It appears that in their perplexity 45 per cent. of them turn to the retailer and jobber for advice, and less than 10 per cent. to the central station. In the matter of designing or changing the installations, the retailer and jobber have charge of 40 per cent. of the cases, and the central station only 4 per cent. There is a hiatus between the desire for better illumination and the fulfilment of that desire, in which the central stations play an inconspicuous part. Strange as it may seem, the central stations are apparently content to permit outside interests to design and install the apparatus by which their product—electrical energy or illuminating gas—is converted into illumination, which, in the last analysis, is what their customers are paying for. Once the installation is completed, the contractor withdraws from the scene and the central station maintains contact chiefly through meter readings and bills,—and possibly complaints.

Co-Operation Is Not Encroachment.

There is a feeling among the officials of central stations that they do not care to encroach upon the domain of the contractor, retailer, and jobber, although they do that to some extent in the disposal of household appliances. There is considerable difference between encroachment and co-operation, and there is great need for the latter. In the past, contractors and jobbers have not been very aggressive in securing lighting installation work, nor are they strenuously exerting themselves to obtain such business at present. They are not, as a rule, employing soliciting lighting experts to canvass for lighting business. They have been content to assume a receptive or "Barkis-is-willin" attitude. This may be accounted for, in part at least, by the fact that although the contractors and jobbers supervise 40 to 45 per cent. of the lighting installations, they do not by any means make up that percentage of the total membership in the Illuminating Engineering Society. If they could pool their interests with the central stations, and all could agree upon standards of illumination, upon methods of soliciting business, and upon the apportioning of the expense, material progress could be made. The factory owners and workers would profit in many ways; the central stations, the contractors, and the dealers would increase their business, and the economic loss to the community would be decreased.

The Yarmouth Light & Power Co., Ltd., Yarmouth, N. S., with power plant at Carleton, N. S., are installing at their plant a 750 kv.a. generator, Canadian Westinghouse type, operated by a 1,000 horsepower water-wheel; also three 250 kv.a. Westinghouse transformers with necessary switchboard and lightning arrestors.

Daylight After Dark

A Description of the Sheringham Daylight Reflectors

[illegible] years I have watched the experiments [illegible] by illuminating engineers in the matter of producing suitable apparatus to bridge the gulf between daylight and artificial light. Many types have been developed. [illegible] and [illegible] produced an electric arc with a blue-silicate transmission glass. Dr. Mees produced a special glass with a gelatine correction screen for metal filament lamps. Ives and Brady produced a glass for accurate color matching with the Welsbach lamp. Professor Gage produced the Corning filter and then came the blue daylight lamps. The work of these gentlemen and others that I have not mentioned added materially to our knowledge of the subject. It seems to me however, after studying the methods of M. Sheringham, Dr. Martin and Major Klien, (the producers of the Sherringham Daylight Reflector) that they confined their labors principally to the elimination of foreign rays from artificial lamps by means of blue or violet screens. We know that the proportions of colors in the spectrum at "average daylight," North Sky Light, are approximately red-orange ray 21½%, yellow-green ray 32%, blue-violet ray 46½%, whereas artificial lamps, (gas-filled) change the proportions of these rays to approximately, red-orange 54½%, yellow-green 32½%, blue-violet 13%. It is evident therefore, that the experimenters endeavored to restore the proportions of these rays by employing the lost percentage of blue-violet rays. As far as I know the introduction of all the colors of the spectrum in their proper proportions to artificial light was never attempted before their application by Mr. Sherringham and his colleagues.

The original "exhibit" daylight reflector which I saw at the Sheringham office in London last winter consisted of a metal half cone reflector, coated inside with blue and yellow circles alternately from the apex downward. Red squares were intersected at certain spacings to equalize the proper proportions of the rays of the Spectrum. A 500 watt type "C" lamp with the lower half silvered, reflected the light on to the colored surface of the reflector. Unlike some of the former methods of attempting to restore the lost proportions of the daylight rays by relying solely on the blue-violet ray; proportionate colors were added to equalize and restore the percentages lost in the change from normal daylight to artificial light. The result can only be described as daylight. It is artificial daylight of course, but nevertheless as far as the electrical industry and other vitally affected industries are concerned they can now command daylight after dark.

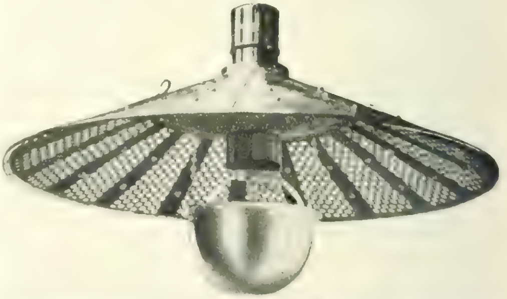
At the time of my visit I could not help thinking that the results obtained by these colors would not be other than temporary on account of their subjection to the rays of a high power lamp and to the intense heat derived therefrom. The question of absorption also had to be taken into account. Accuracy of the rays reflected were subjected to the absorption by the paint of the reflecting surface. As these colors lost their original surface by the action of light and heat the reflected rays would also be inconstant. These problems, however, were in able hands, and I have recently been advised that proper non-changing non-absorbent pigments have been produced and that a commercial type of reflector reproducing normal daylight, North Sky Light, has actually been delivered.

Sunshine After Sunset.

[illegible] different [illegible] light, as [illegible] daylight. [illegible] light is quite different from North Sky Light and is not nearly as useful for commercial purposes as the latter on account of its inconstancy. It has its uses, however, in such places as nurseries, hospitals, kindergartens, etc., and the development of this type of reflector is well in hand. There is also a Diffused Sunlight type reproducing daylight such as we get on a fine day when the sun is slightly veiled by light clouds or thin mists as we get in this country. This type should, in my opinion, be the most desirable of all. Diffused sunlight in theatres, general stores, factories and homes on dull days or at midnight, cannot fail to make our living conditions better. The commercial North Sky Light, of course, is the most valuable, with it the standardization of dyes and colored objects will be made possible at all times of the day or night. Mr. Sheringham and his colleagues have obtained sunlight results in the same manner in which they have perfected the average Daylight, North Sky Light type. Constants have been fixed for the proportionate rays in the Spectrum at sunlight, just as they have been fixed in the average daylight. The restoration of the percentage lost in changes to artificial light is made up by the colored pigments in the reflector.

It must, however, be borne in mind that the Sheringham invention is not confined to reflectors or any particular lighting apparatus. It is a principle or method that may be applied to any form of artificial light, without altering the type or style of the lighting equipment. It need not be attached to or connected with the lighting equipment at all. It could be applied to the ceiling or walls of the room providing it was placed there according to the Sheringham formula. Supposing a room in a hospital was shut off from sunlight through lack of windows. The Sheringham formula for Diffused Sunlight could either be applied to the lighting fixtures or to the ceiling of the room and the patient could have a sunlit room day and night. Or supposing Noon Sunlight was desired in a kindergarten school, the same course could be followed. On the other hand, the method is certain to be applied to reflectors in general. It would not be practical to have the ceilings or walls of factories treated, on account of the difficulty of keeping them clean. This class of lighting will nearly always require reflectors.

The North Sky Light industrial pattern has already been produced and while it is suitable for nearly every class of industrial work yet, the following industries are most particularly benefited: art galleries, laboratories, textile mills, color printers, spinners, weavers, paper makers, color makers, dressmakers, clothing shops, haberdashers and similar places.


View of the Sheringham Industrial North Skylight Reflector showing the reflecting bowl and ventilating top.

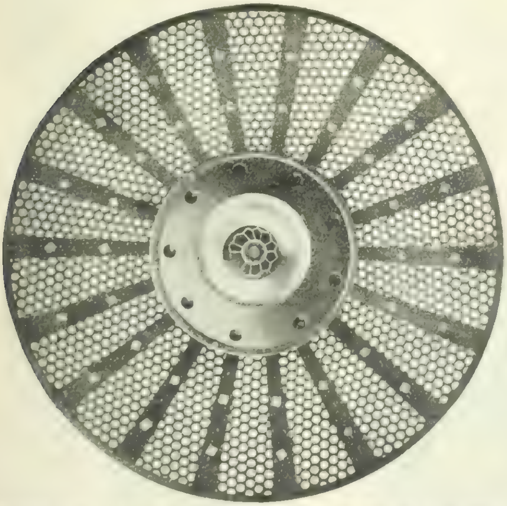
The Noon Sunlight type does not seem to be so well suited to this climate as it is to the English. Our high noon lights are too strong and has little to recommend it. There are places however during winter months where Noon Sun light would be most desirable. Sick rooms, nurseries and such places. This type is, in my opinion, indispensable to the European climate.

The Diffused Sunlight type is the most desirable of all; perhaps not so efficient as the North Sky Light, type, nevertheless the blessing of having diffused sunlight at one's command cannot be over-estimated. This type should be termed "The Home Light," because it is so suitable and pleasant for the home. Dull wet days can be turned into sunny days in the home by turning the switch. The tired business man that plods home in the cold and wet can sit in his armchair and read his paper under diffused sunlight. This type should also find a great demand in public buildings, schools, department stores and many other places.

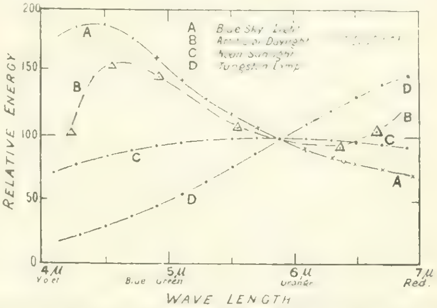
The invention, like many other valuable ones, is based on simplicity. After decades of experimenting by illuminating engineers, it remained for a portrait artist (Mr. Sheringham) to find the key to the whole riddle. After all it is a very simple and logical solution and one wonders why someone did not apply this method before. Able men for a long while have been endeavoring to restore daylight by applying blue-violet screens. There does not seem to be, however, any record of them making up the lost proportions of the red-orange ray, and yet 33% of the ray was lost in the change from average daylight to artificial light. It is, therefore, logical that Mr. Sheringham and his colleagues are on the right track.

A great deal of comment has been going on for many months in the press as well as in the technical journals on this invention. In England and the United States alone, more than 1,300 papers have expressed their favor of it. Even that very august journal, "The Illumination Engineer," the official organ of the Illuminating Engineering Society of Great Britain, has devoted many pages to it.

There is another very hopeful feature about the Sheringham reflector and that is the calibre of the men behind it. Mr. Sheringham is not so well known in scientific matters. He is a portrait artist and evidently very well up on color matters. Dr. L. C. Martin, D.I.C., A.R.C.S., B.Sc., is a lecturer in optical science at the Imperial College of Science, London. Major Adrien Klien, during the war was director in the experimental work at the Camouflage School and as adviser on color physics to the Calico Printers' Association. Mr. C. C. Hayer-Millar, their business agent, is a well-known electrical engineer. It is reasonable to expect, therefore, that men with these qualifications can be relied to overcome whatever difficulties might arise in the production of these reflectors.



Detailed view of North Skylight type, showing new method of arrangement of colored pigments.



Distribution of energy in the visible spectra of various illuminants compared with that of the Sheringham daylight

It is almost impossible to overestimate the ultimate value of Daylight Reflectors. Hundreds of problems will be solved by standardized lighting. In fact the coming of these reflectors will revolutionize artificial lighting and if only a part of the hopes of Mr. Sheringham and his colleagues are realized, the coming of Daylight after Dark will be a great boon.

Hydro Power at Barrington, N. S.

A company has recently been incorporated with an authorized capital of $20,000 to provide the town of Barrington, N. S., with electric light and power. It is the intention of the new company to install sufficient capacity to provide light and power also for the town of Woods Harbor. The power house, which has just been completed, is situated about two and a half miles from Barrington. It is a hydro-electric plant, and so situated and planned that it is believed there will be no ice trouble. The following are the officers of the company: President, E. C. Hogg; secretary-treasurer and superintendent, W. T. Lewis; board of directors, E. C. Hogg, W. T. Lewis, Stanford Smith, and the Hon. R. Irwin, Speaker of the House of Assembly, Province of Nova Scotia.

Pumping By Electricity

The Westco Pumps Limited, 707 Yonge Street, Toronto, had an interesting exhibit just outside the Electrical Building, of the Westco Water System without a tank. It is a direct water pumping system, pumping the water direct from the well into the house. The motor is automatically turned off or on by the use of the faucet. The capacity is from 300 to 500 gallons an hour according to the size of the motor installed. The Westco water systems can be run off farm light plants, as well as central station current.

The Canadian Gazette notes the incorporation of Guarantee Batteries, Ltd., with head office, Guelph, Ont., organized for the purpose of manufacturing and dealing in all kinds of electrical batteries.

Messrs. McDonald & Willson Lighting Co., Winnipeg, Man., have been awarded the contract for the electrical work on the new school at West Kildonan, Man.

Montreal Electric Fraternity Now Organized As "Montreal Electrical Club." Rousing Meeting Marks Inauguration of 1920-21 Season

With an attendance of over one hundred, the initial Weekly Electrical Luncheon, was held at Montreal on Oc-
Weekly Tlecerical Luncheon, was held at Montreal on October 6th.

Mr. W. H. Winter, president of the Montreal Weekly Electrical Luncheon, occupied the chair. The secretary of the club, Mr. T. H. Chennell, read the following report of a meeting of the general committee which was held at Montreal on September 29th.

"A meeting of the general committee of the Montreal Weekly Electrical Luncheon was held in Freeman's Hotel, Montreal, on September 29th. Mr. W. H. Winter, president, occupied the chair. The following members of the committee were present: Messrs. L. A. Johnson, Northern Electric Co., Ltd.; P. T. Davies, Southern Canada Power Co., Ltd.; J. J. Sorber, Economy Fuse and Mfg. Co. of Canada, Ltd.; W. H. Winter, Bell Telephone Company of Canada; C. Thomson, Fred Thomson Co., Ltd.; G. E. Templeman, Electrical Service Commission. P. A. MacFarlane, Bell Telephone Company of Canada; T. H. Chennell, Bell Telephone Company of Canada; R. J. Beaumont, Shawinigan Water & Power Co, Ltd.; E. W. Sayer, Sayer Electric Co.; R. Moncel, Devoe Electric Switch Co., and E. S. M. MacNab, Canadian Pacific Railway Company.

"After luncheon the committee discussed several matters of importance pertaining to the welfare of the luncheon.

"The papers committee has had several names added to it, in order to lighten the burden of the former incumbents, and also to broaden the field of selections of speakers. It would naturally help the luncheon as a whole if every member of the club considered himself as part of the papers committee, and in handing in to any member of the committee the name of a possible speaker, it would assist that committee to a very large extent.

"The next matter discussed was one pertaining to the financing of the luncheon. In the past the luncheons have only been made possible by contributions from utility companies, electrical manufacturers and contractor dealers. No membership fee of any kind has been charged since the organization of the electrical luncheon in 1916. Last year a financial committee was elected who undertook to raise the funds necessary to meet the expenses of the luncheon. This committee, as far as it was able to function, did excellent work, but was hampered in its efforts by the serious epidemic of Flu which was prevalent at the time of its first efforts. Instead of a personal visit of the committee to the various firms, as planned, it was only possible to circularize the different firms and ask for subscriptions. Although this method brought forth more or less satisfactory results on the first request, it was necessary to send out another similar appeal, which enabled the committee to carry on for the balance of the year.

"The members of the committee, however, now feel that it is not right that only a few should carry the burden of the financial end of these luncheons. It was, therefore, proposed that a nominal membership fee of one dollar ($1.00) per year be charged each member, and that a membership card be issued.

"In the case of the larger firms, instead of asking for contributions, as in the past, they will be asked to purchase a number of membership cards for their employees. The matter of membership cards does not mean that those not holding same will not be welcome to our meetings, but it is felt that the nominal sum asked for will be gladly contributed. Should any members desire at any time to bring a friend to any of the luncheons, they will be at liberty to do so, and they will be made royally welcome.

"The matter of changing the name of the luncheon was also brought up, and it was the opinion of your committee that a more suitable name would be the 'Montreal Electrical

Mr. T. H. Chennell, Secretary-Treasurer Montreal Electrical Club

Mr W H Winter, re-elected President Montreal Electrical Club

R L Calder, K C, who addressed the club at the inaugural meeting

Club," which would be more in keeping with our activities, seeing that we are more than a luncheon club, as we are broadening out to social activities, etc.

"Another matter brought up was the allotting of five or ten minutes, each meeting, for short talks by any out-of-town guests, who would care to address the luncheon. In this way it is felt that the good points regarding the electrical industry as a whole, would be brought out to the advantage of all."

After the reading of the above report, the election of officers for the coming year was held. The following names were brought before the members of the luncheon and were unanimously elected: Prsident, W. H. Winter, Bell Telephone Company of Canada; Vice-President, P. T. Davies, Southern Canada Power Co., Ltd.; Secretary-Treasurer, T. H. Chennell, Bell Telephone Company of Canada.

General Committee: Messrs. R. J. Beaumont, chairman; J. A. Burns, Munderloh & Co., Ltd ; J. O. G. Cann, Marconi Wireless Telegraph Company of Canada, Ltd.; C. Duncan, Duncan Electrical Company, Ltd.; M. C. Gilman, Montreal Light, Heat & Power Co., Ltd.; L. A. Johnson, Northern Electric Company, Ltd.; C. S. M. MacNab, Canadian Pacific Railway Company; J. McMillan, Canadian Pacific Telegraph Company; W. P. Roper, Canada Wire & Cable Company; W. B. Shaw, Montreal Electric Company, Ltd.

Finance Committee: Messrs. J. W. Pilcher, chairman, Canadian General Electric Company, Ltd.; J. J. Sorber, Economy Fuse & Mfg. Co., Ltd.; C. Thomson, Fred Thomson Co , Ltd.; J. B. Woodyatt, Southern Canada Power Co., Ltd.

Luncheon Committee: Messrs S. W. Smith, chairman, Electrical Equipment Co., Ltd.; A. J. Carrol, Eugene F. Phillips Electrical Works, Ltd.; R. Moncel, Devoe Electric Switch Company, Ltd.

Entertainment Committee: Messrs. E. W. Sayer, chairman, Sayer Electric Company; J. A. Dawson, Dawson & Company, Ltd.; N. S. Richards, Northern Electric Company; L. V. Webber, Jefferson Glass Co., Ltd.

Papers Committee: Messrs. G. E. Templeman, chairman, Electrical Service Commission; E. S. Gregory, Shawinigan Water & Power Co., Ltd.; P. A. MacFarlane, Bell Telephone Company of Canada, Ltd.; J. A. Shaw, electrical engineer, Canadian Pacific Railway; D. H. Ross, Sangamo Electric Company of Canada, Ltd ; F. J. Parsons, McDonald & Willson; J. M. Mochon, City of Montreal, and H. W. Wood

How Should Montreal be Governed?

The speaker at the luncheon was Mr R. L. Calder, K.C. well known to Montreal electrical interests, who delivered a forceful and interesting address on the subject, "How Should Montreal be Governed in the Immediate Future?"

The speaker indulged in some humorous reminiscences and recalled the time when some of Montreal street lighting was done by oil lamps, each having been lighted in turn by a lamp-lighter.

Montreal had always been misgoverned, and it was now time for a thorough and final house-cleaning—for the application of some of the first principles of civic government.

Montreal's Unenviable Distinction

Analyzing the causes of misgovernment, Mr. Calder attributed the unsatisfactory state of affairs in Montreal in the first place to the fact that although the city had long since attained its majority, it was still held in tutelage by the Quebec legislature. In the second place there were two strong nationalities touching at every point without meeting anywhere. Montreal was the only city in the world that could not make a contract on its own responsibility. The comercial metropolis of Canada was governed from Quebec City, where it had an infinitesimal representation in the provincial legislature, where the perennial subject of revising the city's charter had become a standing joke.

The situation was disastrous in its effects. When the city wanted to buy land—purchase a park, for instance—it was compelled to advertise its intention by going down to Quebec and seeking the necessary authority—with the natural result that when it came back the land had gone up in value.

The provincial legislature, which had no direct connection with the city, and with whom no bond of understanding existed in regard to the city's problems, directed the city's undertakings and passed the city's contracts.

"The Devilish Factor of Divided Responsibility"

Misgovernment had grown in exactly the same proportion as the city's interests and activities. The main cause of inefficiency was the devilish factor of divided responsibility. When anything went wrong, the city fathers threw the onus on the legislature. The speaker cited in contrast the government of the city of London, which was absolutely autonomous.

One of the main factors in the maladministration of the city's affairs was the fact that there were two bodies of public opinion differing in education and in all other essentials—the one neither better nor worse than the other, but different. Between these two bodies there were barriers of language, religion, and geographical distribution, Montreal having divided itself into sections which were almost exclusively French and English. Whatever bonds of friendship existed between French and English Canadians, the fact remained that the races were dissimilar in viewpoint and ideals, and the resultant disagreement had produced appalling inactivity.

The Mayor's Cocked Hat!

The principal function of the Mayor of the great city of Montreal was not far removed from wearing a cocked hat and calling out the police and firemen in time of war.

The government of the city was on the wrong principle. All intelligent government was based on the Norse system of decentralization, the adoption of which had been practised so successfully by England. The first essential in a revised charter was autonomous government. The legislature of Quebec should resign their authority over the city, and cut the painter absolutely and irrevocably.

Mr. Calder touched ironically upon the wisdom of looking to the United States for examples of good municipal government, and paid tribute to the great British cities of Manchester, Liverpool, Glasgow—and especially London, whose affairs were administered under the County Council system, by which the city was divided up into boroughs. Montreal could be divided up similarly for the purpose of civic government, and in this way the trouble emanating from racial differences would be eliminated.

Division Into Boroughs

The city might well be divided into three boroughs—one for the French-Canadian community, one for the English-speaking people, and one for communities of mixed composition. Each borough would be self-governing within its own limits and would handle its own money and control its own expenditures. Under such a system the citizens would have the advantage of placing the responsibility of municipal undertakings upon their aldermanic representatives

In closing, Mr. Calder depicted the system of civic government by city manager When the principle of democratic control was [illegible] the people

All Electrical Interests in the Pacific Coast Province Co-ordinated Into One Big Co-operative Association

Once more demonstrating the spirit of enterprise and service, which is a characteristic of the electrical industry in Vancouver, the men who are actively engaged in some of its branches, or in co-ordinate industries, held a most successful organization meeting on Tuesday, Sept. 21, at a dinner in the cafe parlors of the David Spencer Co., Ltd., when over two hundred were present. The new institution was named the British Columbia Electrical Co-Operative Association, and it will include every branch of electrical enterprise. A constitution was adopted, in outline, a copy of which is appended to this report.

Acting as chairman of the meeting, Mr. Geo. Kidd, general manager of the B. C. Electric Company, called on representatives of the four principal branches of the industry, the central station, the contractor-dealer, the manufacturer and the jobber, for their views on the proposal, which the chairman outlined briefly. Every speaker endorsed heartily the idea of co-operation, and each dealt with a different phase of the question, suggesting the best methods of making the new association a powerful factor in building up the community and increasing electrical business by better service. Among the speakers were M. R. F. Hayward, general manager of the Western Power Company; Mr .W. G. Murrin, assistant general manager of the B. C. Electric Railway Company; Mr. E. E. Walker, sales manager of the same company; Mr. J. R. Read, district manager of the Canadian Westinghouse; Mr. J. F. Little, district manager of the Northern Electric Company; Mr. H. Pim, district manager of the Canadian General Electric; Mr. E. Brettell, president of the Contractor-Dealers' Association; Mr. Earl Jarvis, of the Jarvis Electric Co.; Mr. F. T. Cope, of Cope & Son; Mr. W. W. Fraser, electrical contractor, and Mr. Jas. Lightbody, publicity manager of the B. C. Electric.

Mr. Walker described the successful working of the California Co-Operative Association of Electrical Dealers, and gave statistics showing the advance in the amount of electrical apparatus sold, crediting the healthy condition of the industry to the co-operative effort. Mr. Brettell urged educative publicity to instruct husbands in the buying of electrical household appliances, in the interests of the housewives, who were thus saved so much household drudgery. Mr. Little dwelt on the need of better wiring systems for houses, providing plenty of outlets for convenient attachment of appliances. Mr. Pim, the veteran of the electrical business in Vancouver, declared that the motto for the new association should be, "Live and let live."

Mr. Jay Lightbody outlined in detail the objects of the association and the plan of campaign for all branches of the trade for mutual benefit as well as for meeting the needs of the public more intelligently. All branches will be represented on the advisory council, which will plan a campaign to be conducted first in Vancouver, including educational methods, better business methods, accounting, sales and advertising, as well as improved store and showroom appearance. It was explained that for the present no fees would be collected, but every one would be urged to assist in committee work and in the campaigns to be conducted.

During the progress of the dinner and of the business meeting afterwards, the proceedings were enlivened by a [illegible] Mr. Geo. Briscoe recited, Mr J. E. Pacey sang a number of solos in excellent voice, Mr. E. E. Hughes read a number of humorous telegrams in a manner to evoke great amusement. Choruses were "executed" by the assembly, and Mr. W. Mainwaring acceptably officiated at the piano as accompanist. Every electrical concern, large and small, in Vancouver, was represented by the manager and members of the staff at the meeting.

Following is the constitution for the new association adopted by the meeting:

CONSTITUTION.

Name.

1. The name of the organization shall be the British Columbia Electrical Co-Operative Association.

Objects.

2. The objects shall be:

(a) To develop the electrical industry by educational methods, encouraging the practice of good ethical business methods and of improved service to the public.

(b) To develop a closer co-operation and understanding between central stations, contractor-dealers, manufacturers and jobbers to the end that the efficiency of the various branches of the industry serving the public may be increased and thrat the customer may obtain better electrical service.

Mr. Geo. Kidd, general manager British Columbia Electric Railway Company and Chairman of the newly organized British Columbia Electrical Co-operative Association.

(c) To help the contractor-dealers improve their business methods, including accounting, sales, advertising and general store appearance, thereby elevating the plane of the retail branch of the industry.

(d) To form a recognized body to promote electrical development in British Columbia, to support each branch of the industry when occasion requires and obtain fair treatment for invested capital on the part of the authorities by working for a fair attitude towards electrical development on the part of the public at large.

Officers.

3. The officers shall consist of a president, three vice

presidents, chairman and vice-chairman of the advisory council and an honorary secretary-treasurer.

Term of Office.

4.—Officers of the association shall be elected at the annual meeting of the advisory council and shall hold office for one year.

Advisory Council.

5.—The association shall consist of an advisory council of ten members; who shall manage its affairs, two to be appointed by central stations, three by manufacturers, two by jobbers and three by the Contractor-Dealers' Association of British Columbia. Officers of the association will be ex-officio members of the advisory council. The advisory council will hold office for one year, dating from the annual meeting of the council.

Meeting of Advisory Council.

6.—The advisory council shall meet regularly once each month on a date to be determined by the council.

Quorum.

7.—A quorum of the advisory council shall consist of four members, one from each branch of the industry.

Annual Meetings.

8.—The annual meeting of the advisory council shall be held on the first Tuesday of October, and an annual meeting of the electrical industry shall be held on the second Wednesday of October, and such other general meetings as the advisory council may deem advisable.

Duties.

(a) The president shall preside at all general meetings of the association. In his absence, a vice-president shall preside.

(b) The chairman of the advisory council, or in his absence, the vice-chairman, shall preside at all meetings of the advisory council, or in the absence of both chairman and vice-chairman, the council shall appoint its own chairman.

(c) The honory secretary-treasurer shall keep a record of the proceedings of the association and shall submit a record of same to the annual meetings and any other meetings and shall transact the ordinary business of the association under the direction of the advisory council. He shall receive all monies and make all disbursements, under the direction of the advisory council. He shall keep an accurate record of all receipts and payments and submit a statement of same, duly audited for the adoption of the annual meeting.

Auditors.

10.—The auditors shall be appointed by the advisory council and shall audit the accounts and sign the balance sheet to be submitted to the annual meeting.

11.—This constitution may be amended at any time by a three-fifth majority vote of the advisory council, provided notice of motion has been given at least one month previously at a regular meeting of the council.

Construction of Washing Machines

The Hydro-electric Power Commission of Ontario, under recent date, issued a tentative specification embodying minimum requirements for the construction of electric washing machines. Of the operating mechanism it says that operating levers, clutches or their equivalent shall be provided so that the motor may be started without the washer or wringer in operation. This has been found to be necessary on account of the trouble occasioned by continued abuse of the motor resulting in dirty contacts, sluggish starting, heavy starting current maintained and consequent failure of proper protecting fuses. It should never be necessary for a family type washing machine to provide circuit fuses for more than 10 amperes.

The motor must be of adequate capacity and suitability provided with splash proof frame or equivalent, unless a metal housing, which serves the same purpose, is used. Where the motor is direct connected to the shafting or gears it is recommended that an approved type of safety clutch or other means be provided which will automatically disconnect the motor if the tub or wringer should become blocked.

Under the heading "Wiring and Equipment" reference is made to the installation of switches, which has been the subject of controversy recently among our readers. In this respect the announcement says that where a snap switch is provided for the control of the motor supply current it shall be of the double-pole type and specially designed for use in damp places, that is, fibre insulation shall not be relied upon to protect the operator from contact with live parts when operating the switch. The switch shall be mounted in such a position that it will be protected as far as possible from splashing water. The regulations further require that all metal parts of the washing machine shall be electrically connected together and provided with some suitable and effective means of grounding unless the motor frame and other electric parts are effectually and permanently insulated from the metal work of the machine.

Personals

Mr. R. F. Hayward, manager of the Western Power Company, is leaving British Columbia to accept the management of the Santiago Light, Tramway & Power Company, which is owned by British capital. Mr. Hayward came to the Stave Lake company eleven years ago. He leaves for his new appointment about the first day of November.

Mr. H. H. Couzens, general manager of the Toronto Hydro-Electric System, has also been appointed general manager of the Toronto Transportation System. The franchise of the Toronto Railway Company expires in about a year and it is the desire of the recently appointed Transportation Commission to have their plans perfected in advance for taking over this system so that there may be as little confusion as possible due to change of management. The idea underlying Mr. Couzens' appointment is that eventually the greatest economies will be effected by placing the management of both systems under one head. With a view to giving Mr. Couzens more freedom in the meantime to attend to transportation matters, Mr. E. M. Ashworth, assistant general manager of the Hydro System, has been made acting general manager.

Mr. H. H. Couzens, manager Toronto Hydro-electric System, who now adds to his duties those of manager of the Toronto Transportation System.

The Contractor-Dealer

Mr. Contractor-Dealer—What About Your Mental Battery?

Do You Keep It Fully Charged?—Is It Improving With Use? Is it Building You a Reputation for Integrity and Service?

This may seem like an unnecessary question to ask, but, on second thought, is it? We are not referring to a crude thing like your automobile battery, but to an infinitely more complicated mechanism—your own mental battery; that delicate instrument that is responsible for all that you do, say and think. What condition is it in? Do you know how to use it? Do you ever examine it, or do you let it take care of itself? Do you know that, unlike other kinds of batteries, it improves with use: that the harder it is worked the better spark it produces, and that the better the spark the surer and more powerful the explosion, and the more powerful the explosion the greater the work done. It is work done that counts in electrical merchandising: something achieved: a new customer for the store: a sale made that was considered to be impossible; an advertising stunt that drew trade: a window display that brought results: a reputation built up for honesty, integrity and SERVICE. These and a hundred other things form the goal towards which every electrical contractor-dealer should press on. But you can't begin to reach that goal unless you have the spark of enthusiasm, yes, and a continuous succession of sparks, and to have that you must have a properly working mental battery, for it is there the sparks originate. The mind conceives an idea, and that conception produces a spark—and the more original the conception the bigger and brighter the spark—and that spark results in action, in SERVICE. You, Mr. Electrical-Dealer, are the electrical PUBLIC SERVICE STATION. You live to SERVE and SERVE to live. Let that thought grip your mind, and send out a current of enthusiasm that will arouse you to the extremities of your being and make you a CREATOR, instead of a creature of circumstance.

Your vocation is an educational one: to educate the people of Canada in efficient household management, and to teach them how to create, by the use of labor saving devices an atmosphere conducive to happiness and refinement in Canadian industrial, social and domestic life. What a task! What a grand and unique opportunity is offered you, Mr. Electrical-Dealer. What a challenge to your personality. How can it fail to charge your mental battery and fire you with a continuous succession of sparks that will result in revolutionizing the homes in your constituency and in making your store an Institute of Electrical Learning in your community. If YOU don't act, someone else will. Opportunities of this nature only come once. Don't say the people do not want electrical conveniences. Don't say they haven't the money to buy them. Don't say they are not interested. If these things were true they would be an indictment against you for not having enlightened the public mind. But they are not true. The people are waiting to be taught, to be served, and they will pay, and pay royally, the men who serve and instruct them in the noble science of electricity as applied to the home, the factory, the office, etc. Get busy on your mental battery! THINK! PLAN! ORIGINATE!—then WORK. Imitate another man in your own or any other line, if you must. That is infinitely better than doing nothing. But THINK, and before long you will have plenty of original ideas. Your mental battery will begin to surprise you, and to strain your power of energy, as well as the capacity of your pocket book, to keep up with it.

From a merchandising standpoint the electrical line is second to none, and better than most other lines. The field is unlimited, and the opportunities for the real pioneer are legion. There are troubles and difficulties, but to the real merchant these only serve to sharpen his wits and tone up his mental battery: they are the props upon which he builds his success. If your mental battery is run down, go and visit a first class electrical dealer's store, or an up-to-date electrically equipped kitchen: then compare it with a kitchen where the work is done "as it was in the beginning"—and they are the great majority—and recharge your battery with the idea of emancipating the Canadian housewife from the drudgeries and weariness of every day household routine. Then go back to your store and start to think, and plan, and work, putting personality into your store and character into your window, and originality and force into your advertising, and service into your salesmanship, and before long the public will have beaten a path to your door—for the public are always eager to learn.

There is no cut and dried rule for success. Personality is the great business builder. Just be YOURSELF. Put YOURSELF into it, and before long you will have become what every electrical contractor-dealer should aim to be—indispensable to those whom he serves. But THINK, and keep on THINKING, for a well built, well kept and smooth running mental battery is at the root of all success.

"Better Merchandising" Shows Initiated by Large Electric Company

In order to do as much as possible in the campaign for making better electrical merchants, the Westinghouse Electric & Manufacturing Company, Westinghouse Lamp Company, and affiliated interests, have initiated a complete plan for merchandising electrical goods. These interests have joined in the formation of the Westinghouse Merchandising Bureau, which is primarily to make special studies of the problems of marketing electrical merchandising and to suggest plans which should result in securing the maximum benefits for all distributors of electrical merchandise. Traveling merchandising exhibits known as "Better Merchandising Shows" have been developed to carry out these ideas.

The Campaign Routine

The jobbers' show will be given first in a certain locality, the exhibit being attended by the jobber's salesmen, his merchandising manager, promotion men and the Westinghouse merchandising specialists who conduct the shows. The jobbers' show will cover two morning and two afternoon sessions of three hours each and one evening session of two hours on the same day. The program follows:

1. Introductory—Object of meetings, plan of meetings, scope of work.
2. Merchandising—What it is, to what lines applicable, why it must be done, how to do it.
3. Advertising—Different kinds, objects of each kind, how the merchandiser uses it.
4. Apparatus—Talk on heating appliances, ranges, fan motors and sewing machines.
5. Stocks and service—volume and diversity, inventories and reports, stocks of dealers and contractors, use of lamp service record, repair part stock, service plan on heating apparatus and ranges.
6. Value of a lamp contract.
7. The Westinghouse industries.
8. Demonstrations — window illumination, window trimming, counter displays, shelf displays, demonstrations.
9. Jobbers' follow-up "Show"—getting new retail outlets, strengthening present dealers and contractors, how to run the "dealer show" and campaign, making permanent the "Better Merchant," exhibition of data showing past accomplishments.

Afterward the dealers' show will be ready for this territory, and will be given on each "dealer's centre." This centre will be chosen with respect to geographical location, train service, local buying tendencies, etc. In the East the centres will average about 50 miles apart and in the West about 100 miles. At these shows there will be in attendance the district office promotion men of the lamp and electric companies, the lamp and electric company salesmen and the agent jobbers' salesmen handling the customers who were invited to the show and the jobbers' merchandising manager. The program of this show is as follows:

1. Objects of the Show.
2. Plan and Scope of Work.
3. Merchandising.
4. The Show Window.
5. The Counter Display.
6. Arrangement of Appliances.
7. Store Display of Ranges.
8. Store Display of Sewing Machines.
9. Store Arrangements.
10. Arrangement and show of Material on Shelves and in Wall Show Cases.
11. Publications and Books on Store Management.
12. Store Accounting.
13. Time Payments.
14. Local Advertising.
15. Local Campaign.
16. Manufacturer's Advertising.
17. Advertising Helps Supplied by Manufacturers
18. The Westinghouse Companies.

There will probably be duplications made for each of the company's districts. The shows contain some twenty wall charts, showing merchandising methods and containing ideas and statistics, and model store windows, showing also good and bad lighting of the display .

Say "Merry Christmas" Electrically

The Society for Electrical Development Launches Another Campaign to Help the Industry Sell

"Say Merry Christmas Electrically" is the idea which will be sold to the holiday shopper as a result of the big drive now being started by the S.E.D.

Electrical dealers throughout the country who take advantage of the Society's help will profit. Central stations will be benefitted, whether they sell appliances or simply service. Jobbers will feel the effects of the drive quickly. Manufacturers, of course, will derive the ultimate benefit. All will profit to the extent that they will get behind the movement and push.

Th 1920 holiday selling movement will be a drive for the entire electrical industry. Benefits are not confined to the S.E D. members; all may take part. Members will, of course, have the usual advantage in being able to obtain campaign material practically without cost.

The feature of the campaign material to be issued this year will be the five-piece window display cut-out. This beautiful set will be lithographed in eight colors. It will be of such a nature that it will be appropriate in any size or shape of window. With the cut-outs will be included full illustrated instructions for making the most effective use of the material.

An innovation this year will be attractively hand-lettered invitations for merchants to mail their prospects urging them to visit their shop and see the display of electrical Christmas gifts. These will be printed in two colors on folded sheets of note paper, envelopes to match being supplied.

There will also be folders and booklets describing and illustrating many different electrical gifts. There will be lantern slides and the always popular poster stamps. The poster stamps will carry the design used on the central panel of the window display cut-outs. They will be printed in five colors.

In the Holiday Campaign issue of the Sales Service there will be from 15 to 20 newspaper advertisements. Every ad. suggestion is illustrated and cuts or mats of the illustrations will be supplied by the society to all those wishing to use them.

If there are any electrical merchants who are laboring under the impression that it will not be necessary to make any particular effort to secure a satisfactory volume of Christmas sales they are doomed to disappointment. There

The Society for Electrical Development are giving splendid assistance to merchants to enable them to put across the "Say Merry Christmas Electrically" idea.

is business to be had—ample business—but we must work for it. Merchants in other lines are realizing this and will make unusual efforts to secure their share of the holiday trade. If the Electrical Industry is to get its share it too must work and work hard. The society is offering splendid aid, but it is up to the individual merchant to make the best use of this help, if he would gather his share of the Christmas dollars.

Sell More Soldering Irons

There are almost a thousand and one little things about an ordinary home where a soldering iron will save its cost in a very short time, yet everybody knows the difficulty of heating the ordinary iron and soldering in the old way. The problem is solved by the electric soldering iron, and every home is a prospect. In these days when sensible people buy sensible Christmas presents for their sensible friends, there seems no reason why a soldering iron should not make a suitable Christmas present. Every home needs one—for work around the automobile, to mend the kiddies' toys, the leaky kettle, and all sorts of kitchen utensils. The current consumption does not amount to very much, and a little practice will make this one of the handiest electric tools in the home, and one of the greatest money-savers.

The Electric Fan Useful the Year Round

In some way or other the general public have got it into their heads that electric fans are hot weather appliances, and that they have no value beyond the two or three hot months of mid summer. It has been demonstrated beyond doubt, however, that an electric fan can be used with great advantage in equalizing the temperature of a room in cold weather. Simple measurements will demonstrate the fact that the temperature at the top of a room, near the ceiling, is several degrees warmer than the temperature at the floor, and indeed our own feelings, deceptive as they often are, tell us that our head is often hot and our feet cold when we should prefer the reverse. The use of an electric fan to equalize the temperature, to bring the warm air down [illegible] percentage of our coal bill in the winter months. Because the hot weather is over, don't stop selling electric fans.

Better Lighting on the Farm

The Benjamin Electric Mfg. Co. of Canada are distributing a very attractive revised booklet entitled "Better Electric Lighting On the Farm." Already it is claimed there are over 10,000 farms in Canada supplied with electric light. Where the farm is within reasonable reach of a central station supply, a 110 volt system is usually in use, but where isolated plants have been installed the 32 volt system is most popular. The Benjamin catalogue describes equipment applicable to the different voltages.

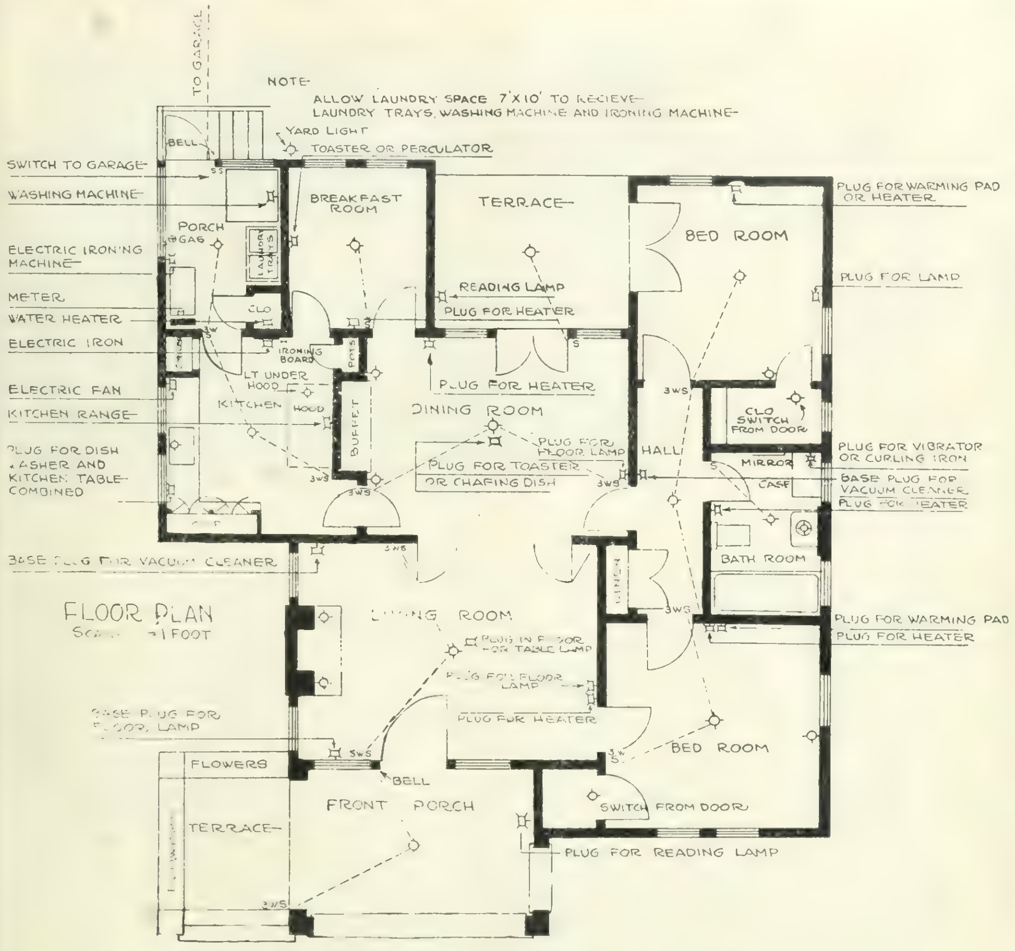
Mr. Horner Finds Business Good

Mr. J. C. Horner, who looks after the advertising end of the J. H. Edmunds Company business, has just returned from a trip west, taking in the larger cities through to the Coast. He expresses himself as very pleased and enthusiastic with the reception he received when calling on the lumber mills, shipbuilding plants, and other large industries, introducing the Edmunds combination lock-guard and shade, a device to protect lamps from breakage or theft, and at the same time reflect the light where required, instead of permitting much of it to be lost through lack of concentration and direction, as is the case with exposed lights. As a result many firms have placed orders for an initial shipment, while others who have previously given them a trial, are now completing their equipment.

Mr. Harris Joins Banfields

Mr. A. Harris has been appointed general sales manager of W. H. Banfield & Sons, Ltd., and their subsidiary companies. Mr. Harris comes from the Chicago firm of Armour & Co., where he has had more than twenty years' experience.

A convention of electrical interests is being held in the [illegible] Alexandra Hotel at Winnipeg on October 14th and 15th. Messrs. W. L. Goodwin and S. A. Chase are expected to be in attendance.



Model Wiring Diagram of Home shown at the recent Pasadena Convention

A Miniature Power Plant

A miniature power plant to operate piano players is now being manufactured by H. W. Yeager & Co., 154 North 11th St., Philadelphia. It is called the "Aerex," and can be attached to any player piano to operate it electrically. This equipment has been designed primarily for the purpose of giving relief from the tiring foot pedals. A small button starts the motor which plays the roll and rewinds it and then automatically stops. It may be regulated to play loud, soft or moderate tones, and operates on either alternating or direct current and consumes less than 100 watts per hour.

A statement has just been issued by the Brantford Municipal Railways Commission showing gross receipts for the eight months of the year [illegible] expenditures $98,307.49. After deducting interest on bonds and debentures, and making provision for sinking fund the net gain for the eight months was $2,584. From this was deducted $1,000 for depreciation [illegible] injuries and damages, leaving a small surplus of $117.57.

Electrical welding machines are the latest innovations in the roundhouse of the C.P.R. system. One of the machines has been brought to London, Ont., to be installed in the shops for repairing boilers and building up locomotives generally. Two pits in each section of the roundhouse will be equipped with special wiring for 500 volt. current.

During the month of September, 1920, the Toronto Civic Car lines carried nearly half a million more passengers than for the same period the previous year. In September, 1919, there were 2,332,674 passengers carried, while during the past month 2,775,708 traveled. The receipts last month were [illegible] in September, 1919.

[illegible]

In These Days of Keen Competition, Every Electrical Dealer Must Ask Himself—

Is My Electric Store Up to Standard?

If We Hope to Get Our Share of Trade in General, and Holiday Trade in Particular, We Must be a Little Better than the Best

Retail business in nearly every line is somewhat slack.

When fish are scarce what precautions does the fisherman take?

He uses the best bait he can find.

The same is true of the experienced retailer.

When business is bad he settles down to work. He searches for better bait. He uses all his resources to draw trade. The more resourceful the retailer, and the wider his experience, the more trade he will get.

And his competitors will get less.

Right there is one big reason why the electrical contractor must busy himself right away—get into the race for more business—because, if he doesn't, his competitors in other lines will gobble up most of the holiday trade.

Look at these windows and store interiors. Not much like the showing the electrical industry would have made five years ago, eh? Right now we have some of the best "Merchandisers" in Canada, and if we keep going like the last three or four years, all other lines will be looking to us for ideas. Some of the best stores in Canada come from the west, and it is the universal comment of travellers who return east that the electrical stores in Western Canada have shown a most wonderful development.

We show a number of electrical windows and interiors in this issue just to let our readers in general see that some of our dealers are very wide awake. Some of the windows show manufacturers' "helps" being used; for example, the handsome window of the Montreal Light, Heat & Power Company. If this large organization finds it useful to tie in with these "helps" then surely it would be a worth while idea for smaller dealers to do the same.

A Fine Sample of the "Electric Shop" Comes from Saskatoon

The Electric Shop, Saskatoon's best known electrical store, under the guiding hand of D. F. Streb has risen from a small beginning to the point where it leads all others in the retail electrical business in Northern Saskatchewan.

The excellent display windows are always well dressed and a real drawing card.

The interior is tastefully arranged, showing to good advantage a large stock of fixtures and glassware. The commodious room allows of a splendid display of appliances and his arrangement of washing machines, vacuum cleaners, ranges, etc., is second to none in the west.

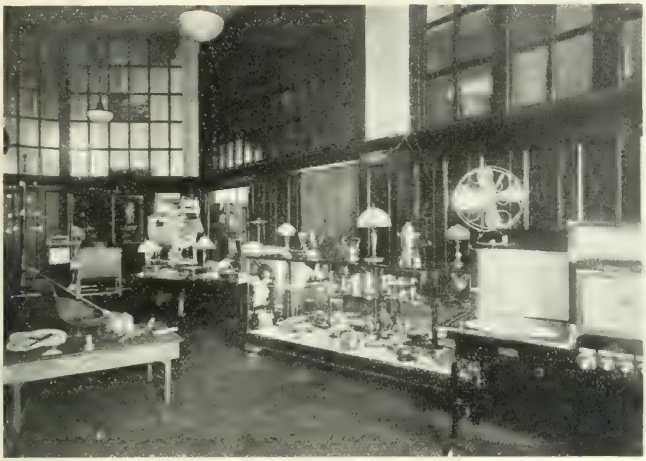
It is apparent, too, that Mr. Streb realizes the value of service, as a look at his repair sheets discloses.

Due to his carrying ample stocks he is at all times in a position to handle contracts, be they large or small.

That the policies of the firm are correct is indicated by the fact that a branch has recently been opened at Humbolt, Saskatchewan. Certainly, if such a progressive policy be pursued, a continual growth must be assured.

The One-Thing-at-a-Time Idea is Most Effective

Another window display shown here is that of the Rae Electric Co., 810 Yonge Street, Toronto. It is distinctive, and a strong argument in favor of the one-thing-at-a-time idea in window dressing as against the prevailing tendency to "pack" the window. The main feature—the table lamp—is of figured design with polychrome effect, the shade being made of parchment in brown and gold finish. The smaller lamps are of similar design, with the exception of a fancy hand-painted decoration around the shades. The rear of the window was closed off with a curtain hung from a brass rod a little below the ceiling, and a handsome hall lamp, with parchment shade enclosed in a figured iron frame, threw down a strong, even light upon the display. The sides of the window were draped with brown silk curtains, and the floor covered over with pink velveteen. The effect at night when all the lights were lit, was very striking, and as the store is located near one of the busiest corners the exhibit attracts the attention of many passers-by. Mrs. Dickson, wife of the proprietor, Mr. J. W. Dickson, who planned this window display, states that as a result of the exhibit they have had many enquiries from householders for suggestions as to the best methods of lighting arrangement for the home, as well as for advice on general household decoration. Mrs. Dickson is an enthusiast on decorative lighting, and since the store was opened last March, her tireless efforts at attractive window display have done much toward building up a prosperous and promising business. Mr. Dickson, who is an experienced electrician, is chiefly concerned with the electrical contracting end of the business, and by



This is a corner in the New Westminster store of the British Columbia Electric Railway Company. The Pacific Coast is blessed wth plenty of power and every encouragement is given to the use of ranges and heaters of all kinds.

persistent effort and planning has built up an electrical wiring and repairing business employing six electricians. Mr. Dickson is keenly alive to future possibilities in his line, and has just completed arrangements for handling storage batteries and doing battery repairs at the rear of his store. As many of his customers are automobile owners, Mr. Dickson has conceived the idea of having a rubber stamp made announcing his new storage battery service department, and each month when his accounts are sent out, this announcement will be placed on each statement. It is an inexpensive but effective means of advertising. The future progress of this business will be followed with interest because of the initiative, originality and enthusiasm manifested by the proprietors, which have brought this store, in the course of a few months, to the forefront among the contractor dealers in Toronto.

Practical Demonstrations of Appliances Arouse Keener Interest

Mr. O. A. Bishop, 745 Broadview Ave., Toronto, recently obtained an agency for the BlueBird electric washer, and the photograph shown herewith features one of his window dressing campaigns introducing the BlueBird to his constituents. Mr. Bishop went to much work and trouble to obtain illustrations, printed cards and

Ottawa has some very attractive stores as befits the capital of our great Dominion. Mr. Ackroyd's window, shown here, was the means of bringing in a lot of extra business. It was "tied in" with a special "Daylo" campaign.

This is one of the handsomest stores in Western Canada owned by Mr. D. F. Streb of Saskatoon, Sask. Mr. Streb also has an electric store in Humboldt. This is the most effective answer to the "hardware" competition.

announcements to put in his window, as well as to get up appropriate window decorations. One of the most interesting features of the display was the ribbon "stunt." For example a card on which was printed the merits of the motor was pasted on the window, at about the eye level, and from it a ribbon was run to another card lying on the floor of the window bearing the word "Motor"; in a similar way all the other parts of the machine were described. Many little BlueBirds were in evidence, and a real BlueBird washing machine was placed in the doorway inviting the housewife to inspect it for herself. At certain periods in the day and evening a lady demonstrator was on duty to explain and answer any questions which might arise and to operate the machine for the benefit of the spectators. This is a splendid window. As an advertisement for the BlueBird washing machine its effectiveness might possibly have been increased by screening off the interior of the store.

Mr. Bishop has a small motor truck which he uses in his business, and which he has decorated up with advertisements of the BlueBird washer. This he considers to be very effective advertising, not only for the BlueBird but for his business in general. Mr. Bishop has proven himself energetic and resourceful ,and is fortunate in possessing a store in one of the best known and rapidly growing districts in the city.

Guy and Ed. of Calgary are Live as Electric Wires

Calgary's leading Electric Store was started away back in September, 1912, by two young men, G. W. Budden, known as "Guy" and E. W. Beard, known as "Ed", under the name "Budden, Beard & Co., Ltd.

The store was located in the south-west outskirts of this growing Western city which was then little more than a good sized town and for three years this location was occupied by the boys

One of the best planned interiors we have seen. The walls are lined with attractive shelves, the most-up-to-date show-cases constitute the counters and enclose the more perishable goods while other appliances are displayed and demonstrated in the main body of the store. D. F. Streb, Saskatoon

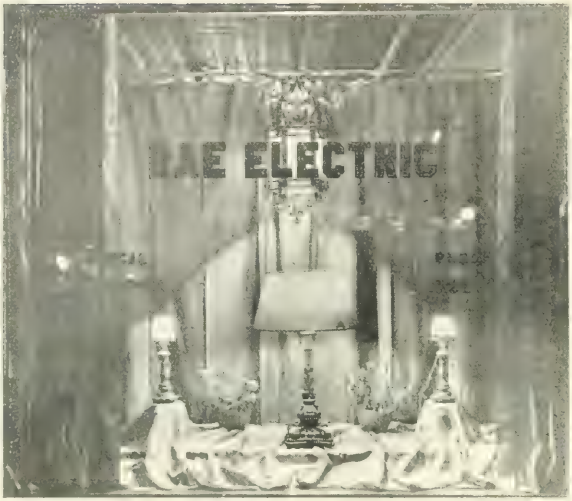
From a small beginning in **1912** the business of Budden and Beard has kept pace with the wonderful growth of their home city—Calgary. This store is situated on the busiest corner where electric stores should always be found.

more along the line of contracting and house wiring than as a retail store. They started with a staff of three and built up a steadily increasing contracting business until the fall of 1915 when contracting fell flat, and it was deemed necessary to secure a more central location in the heart of the city to increase retail store sales; result a store was opened on Eight Avenue, the main street, and the wisdom of the move was at once apparent, as the cash register began to work in dead earnest from the very first day. This store very shortly become so busy and congested it was pronounced inadequate to handle the down town trade and the partners were forced to look around for a larger and better location if such were to be found, and, in the fall of 1917 they moved into their present spacious quarters on the busiest corner in Calgary, Eighth Avenue and First Street West. This later move spelled success as has been amply proved by each month's increasing business. In 1918 they bought out the Calgary Electric Company Limited and in November same year they opened the branch store at 130-8th Avenue East, thus running two electric retail stores in Calgary. This branch store brought in one third more business and a lot of new customers which were not reached by the main store.

To-day they have the largest retail electric business in Western Canada, and have a separate department for selling electric washers, vacuum cleaners and ranges, in charge of an expert salesman, Charles M. Martyn. A great many large electric laundry washers have been sold to hospitals, laundries and hotels, etc., by calling two mornings a week on prospective customers.

Every article in both stores, except portable lamps, cleaners and washers, is under glass, which means freedom from dust. All counters are silent salesmen and the walls are covered by glass wall-cases, which keep the stock clean and fresh looking. Both stores are finished in oak

Interior of the electric store of Bullen & Beard, said to be the finest in Western Canada. Every article in the store has the price prominently displayed. Firm believes in consistent advertising. Larger appliances sold on terms if necessary.



The one-thing-at-a-time store is shown here in a most attractive display. There is much to recommend it for the average window gazer tends to become muddled over the crowded display. This picture will catch the eye of even the passing motorist or street car patron.

and large display windows with low back grounds making the entire store one large window. Lighting fixtures are hung from ceiling boards wired and can be displayed with light on.

Budden, Beard have the price displayed prominently on every article or appliance they sell, whether in the store or on display in the window. They will show as high as eighty different electric appliances in their main store windows and a neatly printed price card will be in plain view before each article shown. They find it pays to handle the best lines that can be had, and

Many Manufacturers Supply Sales Helps gratis to the retailer. Here is an example of a wealthy corporation seeing fit to make use of them. The Montreal Light, Heat and Power Company are noted for the richness and artistic effect of their window decorations.

Here it is right out on the door-step where every passerby can examine and admire. The window display is specially arranged to familiarize the prospective customer with the machine's various parts. Mr. O. A. Bishop, Toronto, is always profiting by his own original ideas.

always talk quality. It is just as important to let the customer know the price at the outset and not spring it on him afterwards. When windows have been dressed and price cards left out customers would glance at windows a moment and pass on. Next day when a price card was put on each article a crowd would soon accumulate and you would see them sizing up the article with the price. Results would be shown almost immediately in the cash register. All goods are sold at regular retail prices, never below. They demonstrate every appliance in the store, also make demonstrations of washers and cleaners in the home. It has been found profitable to sell large appliances on terms as well as for cash.

All credit sales are carefully looked into before closing and so far they have not lost track of a single customer, or had a loss in any way, and although advertising terms, have found half of their sales were spot cash. When the monthly payments come due they send a "Reminder Post-card" and in this way the payments are kept up to date.

It was found profitable the last two years to add extra lines which go very well with the electrical goods, such as cutlery, pyred, silverware, cut-glass, and shaving supplies. These were just side lines but they pulled up the volume of sales in no small way.

They advertise regularly in the leading local paper, five times a week, and find that good snappy advertisements pay and can trace many direct sales to this medium. They do not believe in the large display advertisements every now and then, but in regular consistent advertising in the same spaces each time, having cuts of the articles to be sold as well as price displayed. They never run a sale at their main store as they believe it cheapens the goods and lowers the dignity of the firm. Instead, they talk quality and service, with a fair price, for each article to be sold.

They are ever on the watch for the very latest in wireless apparatus, household appliances, etc., and their success has been largely due to travelling on the crest of the new dawn of electrical development which has been sweeping over the country to lighten the household drudgery.

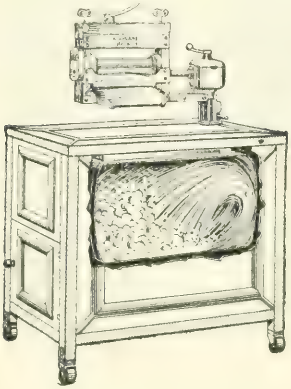
As Soon As You Are Assured of Your Christmas Stock Take the People Into Your Confidence

The moment you get your stock in hand take the people into your confidence. Tell them you are all ready for them—that you anticipated there wishes in advance and can save them endless time and worry. If you put this to them in the proper way they will really appreciate it. Those of your prospects who are previously known to you may easily be told over the telephone. For the rest use letters—but be carefui about these. Give your letters some individuality. Make the recipient feel that you realize she knows the difference between good and bad stationary. Make it look Christmassy. Seal it. Address it carefully and—most important of all—spell the name properly, use the correct initials and be sure you have the right address. This all takes time—a lot of time—but it's worth it. To many people an error in their initials or the spelling of their name hurts their pride. That counts the first point against you in making the sale you are after.

What is Newest in Electrical Equipment?

Washing Machine with Gas Burner Attachment

A new washing machine which washes, boils and sterilizes in one operation has recently been marketed by the Remmert Manufacturing Company of St. Louis, Mo., under the trade name "Airplane" electric washer. Three distinctive features are embodied in this washing machine. First, it has an eccentric-driven rocking movement of the boiler, which causes more forceful water action through the fabric and removes all dirt particles quickly. Second, the gas burner attachment which is located directly underneath the boiler, keeps the water always at the desired temperature. Third, the adjustable wringer which makes possible wringing of clothes from tub to tub is detachable. This allows the washer to be used as a practical house table when cover is replaced and eliminates unsightly appearance of clothes wringer. Other features are: solid copper boiler, eccentric-driven—no mechanical device inside to tear the clothes; all gears and moving parts are enclosed, eliminating all danger of injury; it is equipped with heavy casters and may be easily moved to any part of the room. The washer is equipped with a 1/4 h.p. Westinghouse motor housed in a splash proof compartment.

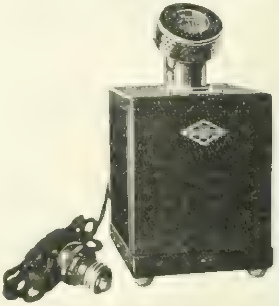


The Wayne Pipe Thawer

The Canadian General Electric Co. have brought out a useful piece of equipment in the Wayne Pipe Thawer which has been developed for use of plumbers. It consists of a transformer, a 10-foot lead for connecting to the lighting circuit, and a second lead for attaching to pipe. This output is already portable and consumes about the same amount of current as an electric flat iron. The principle is a simple reduction of voltage from the alternating current house circuit to enable the pipe to be heated until the frozen water starts to flow. This outfit can be handled with a minimum of labor and without fire risk, and should prove very popular with the plumbing trade or with central stations or contractors as goodwill builders with their customers.

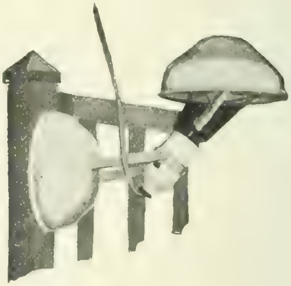
A Handy Cigar Lighter

A piece of electrical apparatus that should make a popular gift for cigar smokers—and that includes a pretty good-sized list—is the cigar-lighter which has been given the trade name of "Duralectric." It is manufactured by Messrs. Clark, Osgood and Alliston, Inc., Bemis Point, N. Y., and is illustrated herewith. It operates on the ordinary lighting socket, using either alternating or direct current. This piece of apparatus should also be a good seller among tobacconists, but more particularly we think among the better class trade for private electrical distribution.



The "Any Angle" Portable Lamp

The "Any-Angle" portable lamp shown here is the product of the Betts & Betts Corporation, 511-513 West 42nd St., New York. By means of this lamp you can have the light wherever you want it. It is equipped with a six-foot portable cord, attachment plug, lamp socket and the "Any-Angle" shade. The lamp complete folds into a neat package 4-in. x 5-in. x 4-in., and will fit conveniently into one corner of a travelling bag. It can be used for reading in bed, for the sewing machine, for shaving or in a dozen and one other ways.



One of the Most Attractive Exhibits

One of the most attractive booths in the Electrical Building at the Canadian National Exhibition was that of W. H. Banfield & Sons, Ltd. Nobody could fail to note and admire this exhibit, but by some unaccountable oversight we failed to include a notice of it in our regular article which dealt with the electrical display. The Banfield Company showed a full line of new fixtures, brackets, conduit boxes, switch boxes, switch and receptacle plates and other accessories, including white metal castings used in the manufacture of domes, etc. The booth was in charge of Mr. W. [illegible]

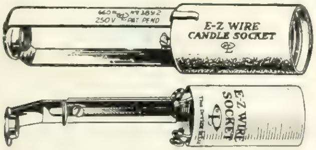
Mazda Type "C" Lamp

A new unit has been added to the line of gas-filled incandescent lamps made by the Westinghouse Lamp Co., 165 Broadway, New York, the National Lamp Works and the Edison Lamp Works of General Electric Co., of Cleveland, O., and Harrison, N. J. This lamp is rated at 100

watts, 20 volts, and has an output of 995 lumens. The makers state that it will undoubtedly replace many of the 100-watt, S-30 Mazda type B lamps as the new lamp is more efficient and fits the largest R.L.M. types of reflectors. The lamp is made in both the clear and the bowl enamel finish.

Three New Candle Sockets

The Peerless Light Co., 663 West Washington Boulevard, Chicago, have placed on the market three new candle sockets which are shipped ready assembled and wired. The leads are long enough to be carried through a bowl hook-arm or other part of a fixture into the centre of it where a splice to each wire completes the wiring. The device has a specially designed plier grip extension piece, of brass, with a 1/8 in. female thread at its base to reduce the work of attachment to the screwing down of one thread joint. The screw shell is of standard size with a heavy porcelain base.



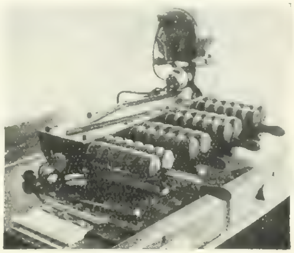
Eventually, Why Not Right Away

Sue Lectrify bought a Who's-It fan
To scare up the summer breezes.
It came one day when the weatherman
Was having the hot-house wheezes.
She placed the fan at a handy spot,
And started to plug the wall,
But the gol-darned kit just would not fit,
And you ought to have heard Sue squall.

But Sue got wise—she's a get-there kid,
And she went to a store and prayed
For a plug that could into her wall be slid,
And they gave her the "parallel blade."
Sue's happy now, for the plug fits right
And the fan breezed a cool "Here's how,"
And the motor sings "Get a standard plug—
Eventually, why not now?"

Motor-Driven Razor Blade Sharpener

A new motor-driven machine for re-sharpening safety razor blades, manufactured by W. F. Cochrane, 3917 South Western Avenue, Los Angeles, Calif., is a radical departure from all processes used heretofore. In the Quadruplex Velvet Edger, as the machine is named, worm stroppers and honers eliminate all flip-flopping motion, the blades in sharpening being held firmly against rolls. There are four sets of rolls, the first being faced with felt, the middle two being the honer and stropper in the order named and the last faced with shell horsehide. Each facing spirals on the roll which as it turns presents a continuous surface to the blade. Spiral gears running in oil turn the rolls and hard bronze bearings are used throughout. Screws allow a micrometer adjustment of the rolls in paralled or in pressure. The machines come in two sizes, a 12-blade machine, like that shown in the illustration, and a 6-blade machine, each being driven by a Westinghouse motor.



N. T. Canopy Ring Extending Field

Mr. F. D. Parmenter, manager Non-Twist Canopy Ring, Canada, Ltd., and Mr. H. C. Tovell, of the same company, have just returned from Cleveland, where they discussed the Parmenter system of fixture installation with Mr. Farmer, president of the National Council of Lighting Fixture Manufacturers and other manufacturers and dealers. These gentlemen were highly pleased with Mr. Parmenters' invention and not only expressed their belief in the need of such improvement, but also their confidence in the applicability of the Parmenter system to these needs. As a result the Non-Twist Canopy Ring, Canada, Ltd., will increase their operations in this country and will also extend operations to the United States and Great Britain.

E. Ladouceur, electrical contractor, Ottawa, has just completed the installation of wiring and fixtures in 25 houses at Linden Lea, Ottawa, for the Ottawa Housing Commission. He has now received the contract for the equipment of three more for the same Commission.

The electrical installation for the Guy Street Shoe plant of the Canadian Consolidated Rubber Co. and the mechanical installation for the new plant for the Food Specialists of Canada are being carried out by the Canadian Comstock Co., Ltd.

Mr. Perry A. Borden, of the Strachan Avenue Testing Laboratory of the Hydro-Electric Power Commission of Ontario, read a paper on October 8th before the American Institute of Electrical Engineers at Philadelphia. The subject of the paper was "The Measurement of Maximum Demand, and the Determination of Load Factor." Mr. Borden has come to be recognized as one of the foremost meter authorities on the continent.

Does The World Owe You a Living?

The world owes no man a living.

We all deserve "to have and to hold" what we honestly acquire by hands and brains, and we deserve no more and in the end will receive no more.

The vast majority of "labor" is honestly endeavoring, under very trying conditions, to do what is fair and right—a vicious minority is doing just the opposite and in so doing is putting a large part of organized "labor" in general under suspicion.

So while 99 per cent. of us all are in the labor class—only about 5 per cent. are in organized Trade Unions. This 5 per cent. have their rights along with their duties—so have we 94 per cent. We wish the best luck in the world to both the 5 per cent. and the 1 per cent. of employers—but as we do not want tryanny from the small 1 per cent. we also want it not from the 5 per cent. who sometimes wish to speak for us all—that is, whose leaders often do.

But beyond and above all else, neither the 5 per cent. nor the 94 per cent. intend to be brought to utter ruin and chaos worst confounded by the heathenish assaults on every tenet of Amerisan life and government by such creatures, mostly alien, with certain renegade of half-baked American citizens as leaders, who compose the rank of the fake Red brotherhood, under whatever name it may flaunt its infamy.

This country is made up of many races and creeds—of many varied ideas, hopes and aspirations—all of which have their place, their rights and their duties; but no section, be it of class or of creed or organization of any kind or description, has any right to consider itself as natural heirs to special privilege and to claim control or leadership over others not of their particular race, creed or position in life.

Being mostly laborers in the vineyard of life, we are all pro-labor or else we are fools—but the vast majority prefer a broad and not a class distinction as to who is entitled to the claim of being "labor" and of leading us into the promised land.

God bless every man who works, and awaken to a sense of duty every man who loafs or engages in unfair aims and selfish objects not for the common good.—Trumbull Ten.

New Books

"High Frequtncy Apparatus," by Thos. Stanley Curtis; Norman W. Henley Publishing Co., New York; price $3.00. This is a practical treatise on the subject. Theory has been omitted because it would confuse the non-technical reader. The designs offered are the results of actual construction and experiment. The work is divided into six sections. The first two chapters deal with what the high frequncy current is, what it is used for and how it is produced. The second section of four chapters describes in detail the principles of the transformer, condenser, spark gap and oscillating transformer, and covers the main points in the design and construction of these devices. The third section covers the construction of small high frequency outfits designed for experimental work in the home laboratory or the class room. The fourth section is devoted to electrotherapeutics and x-ray apparatus. The fifth describes apparatus for cultivation of plants and vegetables. The sixth is devoted to a comprehensive discussion on apparatus of large size for use upon the stage in spectacular productions. Cloth bound, 270 pages, 5 in. x 7½ in.

Electric floor lamps and fixtures are excellent stock for the Christmas trade. The handsome lamp on the left is a product of Baetz Bros., Brantford, and the attractive fixture on the right one of a large stock carried by the Crown Electric Co., Brantford.

CADMIUM-COPPER WIRE

—— THE WIRE FOR WEAR ——

During the War the whole of our output of Cadmium-Copper Wire was taken by the European Governments for War purposes.

We are now once more in a position to supply the requirements of our customers for this well-known wire in all sizes for Trolley Wire, Transmission Lines, Telegraph Wire, &c.

CONDUCTIVITY 7% TO 10% LESS }
TENSILE STRENGTH **10% TO 75% GREATER** } THAN HARD DRAWN COPPER
According to size of wire.

As an Asset Cadmium-Copper has the same Scrap Value as Electrolytic Copper.

TROLLEY WIRE

is manufactured by us in

ROUND,
GROOVED,
NON-FOULING,
SPECIAL SECTIONS

and has been supplied by us to the principal Street Railway Systems of the Dominion. The following Report was received by us from the Superintendent of one of the largest systems:—

> "On May 8th, 1919, we strung the outside curve with a sample of this wire. The opposite curve in the same direction had been strung with ordinary trolley wire a very short time previous.
>
> "On December 21st both curves were measured with a micrometer. This would give each curve 228 days' service, and taking 365 mils as the diameter of a 2/0 wire, we found that the maximum wear at any point on the cadmium wire was 20 mils, while the maximum wear at any one point on the ordinary copper wire was 60 mils. The average wear on the cadmium wire was 5 mils, and on the copper wire about 20 mils.
>
> "At the above rate of wear the cadmium curve should last **between two and three times longer** than the other curve."

SERVICE COUNTS

Eugene F. Phillips Electrical Works, Limited

ESTABLISHED 1889

Head Office and Factories - MONTREAL

Current News and Notes

Cap de la Madeleine, Que.

Mr. J. Lacroix, Cap de la Madeleine, P. Q., has been awarded the contract for electrical work on 20 semi-detached residences being built at Cap de la Madeleine at an estimated cost of $80,000.

Cochrane, Ont.

The ratepayers have voted to purchase the local power plant and telephone exchange.

Glace Bay, N. S.

Messrs. MacLennan & Polley, Union St., Glace Bay, N. S., have been awarded the contract for electrical work on the "Central" school being built at Glace Bay at an estimated cost of $240,000.

Granby, Que.

Mr. J. A. St. Amour, 2171 St. Denis St., Granby, has been awarded the contract for electrical work on $135,000 convent being built by the Sisters of Presentation, St. Hyacinthe, Que.

Grand Mere, Que.

Mr. Louis Vanasse, St. Catherine St., Grand Mere, Que., has been awarded the contract for electrical work on $175,000 academy being built by the Roman Catholic Commission.

Messrs. Plante & Germain, 27a Fifth Ave., Shawinigan Falls, Que., have been awarded the contract for electrical work on $40,000 store being built at Grand Mere, Que., by Mr. J. M. E. Morcotte.

Kitchener, Ont.

The electrical installation of the Dominion Tire plant for the Canadian Consolidated Rubber Co. is being made by the Canadian Comstock Co., Ltd.

Mr. Norman Hagen, 34 Ellen St., E., Kitchener, has been awarded the contract for electrical work on $25,000 residence and garage erected on Margaret Ave. by Mr. A. W. Augustine.

Messrs. Reinhart & Doerr, 192 King West, Kitchener, have been awarded the contract for electrical work on $15,000 business block being built on Young St. by Mr. Ed. Lippert.

Lennoxville, P. Q.

Contract will be let for electrical work on a $25,000 branch of the Royal Bank of Canada, being built at Lennoxville, Que. Associate Architect, J. W. Gregoire, 191 Wellington St., Sherbrooke, P. Q.

Moncton, N. B.

Messrs. T. Johnston Co., Ltd., 736 Main St., Moncton, have been awarded the contract for electrical work on $200,000 theatre being built on Main St. by the Eastern Amusement Co.

Messrs. Perry Bros., 773 Main St., Moncton, have been awarded the contract for electrical work on $100,000 branch of the Bank of Nova Scotia being erected at Main and E. Market Sts., Moncton.

Montreal, Que.

Messrs. Vincent & Say Electric Co., 351 Union Ave., Montreal, have been awarded the contract for electrical [illegible] the Engineers Club, [illegible] Beaver Hall Hill, Montreal.

Mr. J. A. St. Amour, 2171 St. Denis St., Montreal, has been awarded the contract for electrical work on $225,000 school being built by the Roman Catholic School Commission.

New Toronto, Ont.

Plans have been completed by the Anglo-American Auto Co., Room 1504, Royal Bank Bldg., Toronto, for the construction of a $500,000 motor car factory in New Toronto. Separate tenders wil be called for all trades.

Ottawa, Ont.

Mr. H. L. Allan, 272 Bank Street, Ottawa, has been awarded the contract for electrical work on $18,000 church, being built on Fairmount Ave., by the St. Matthias English Church.

Mr. P. Stewart, Daly Ave., Ottwa, has been awarded the contract for electrical work on $60,000 lodge building being built on Spadina Ave. by the Knights of Columbus.

Sherbrooke, Que.

Messrs. Doherty Electric Co., Sherbroke, have been awarded the contract for electrical work on $200,000 branch of Canadian Bank of Commerce being built at Wellington and King Sts., Sherbrooke, P. Q.

The Donahue Electric Co., 30 Wellington St., South Sherbrooke, have been awarded the contract for electrical work on Jewish synagogue being built on Montreal Street by the Jewish Association of Sherbrooke.

St. Catherines, Ont.

The Sterling Electrical Company, engineers and contractors, St. Catherines, have been awarded the contract for the complete 600 kv.a. power and light equipment for the Joseph Stokes Rubber Co., Welland, Ont., who will manufacture hard rubber for electrical purposes.

Toronto, Ont.

The Wood Electric Co., 153 Victoria Street, Toronto, have been awarded the contract for electrical work on $80,000 warehouse being built on Alice Street by Messrs. A. G. Strathy, Ltd.

Mr. A. E. Dollery, 508 Ossington Avenue, Toronto, has been awarded the contract for electrical work on $30,000 residence being built on Teddington Park Avenue, by Dr. W. E. Gallie.

Contract will be let for electrical work on $80,000 factory being built at Spadina and Grange Avenues by the Photo Engravers, Ltd., 70 Bond Street, Toronto.

The Parsons Electrical Co., 135 Essex Avenue, Toronto, have been awarded the contract for electrical work on $25,000 addition to theatre at 533 Queen West.

Contract for the electrical installation of the new factory and machine shop for the Grinnell Company of Canada, at Toronto, has been awarded to the Canadian Comstock Co., Ltd.

Messrs. Bennett & Wright, 72 Queen St. East, have been awarded the contract for electrical work on warehouse and office building being erected on MacPherson Ave, by the Western Canada Flour Mills Co.

Messrs. James Devonshire, Ltd., 659 Yonge St., Toronto, have been awarded the contract for electrical work on $15,000 branch of the Canadian Bank of Commerce erected at Queen and University Sts.

The Toronto Electric Co., 101 Duke Street, Toronto, have been awarded the contract for electrical work on office

Electrical Books—Special Prices

The following Books are Offered Subject to Previous Sale:

"American Electricians' Handbook, a reference book for practical electrical workers, by Terrell Croft. 712 pages, with over 900 illustrations. Published by McGraw-Hill Book Co. Price $5.00

A Handbook on the Steam Engine, by Herman Haeder. Published in 1914 by Crosby, Lockwood & Son. 522 pages, illustrated. Price $2.00

A Laboratory Manual of Alternating Currents, by John H. Morecroft, E.C. Published in 1912 by Renouf Publishing Company. 248 pages, illustrated. Price $1.50

Baudot Printing Telegraph System, by H. W. Pendry. Published in 1913 by Whittaker & Company. 144 pages, illustrated. Price $2.50

"Central Stations," by Terrell Croft, 1st edition published in 1917, by McGraw-Hill Book Co., Inc. 332 pages, illustrated. Price $2.50.

Direct-Acting Steam Pumps, by Frank F. Nickel. Published in 1915 by McGraw-Hill Book Company. 258 pages, illustrated. Price $2.50

Direct Current Machinery, Theory and Operation of, by Cyril M. Jansky, B.S., B.A., 1st edition, just published by McGraw-Hill Co., Inc. 285 pages, illustrated. Price $2.50.

Dynamo-Electric Machinery, by Francis B. Crocker, E. M., Ph.D. Published in 1908 by American School of Correspondence. 236 pages, illustrated. Price 50c.

"Electric Lighting," by Olin Jerome Ferguson. First edition just published by McGraw-Hill Book Company, 343 pages, illustrated. Price, $2.50.

Electric Railway, by A. Morris Buck, M. E. Published in 1915 by McGraw-Hill Book Company, Inc. 390 pages, illustrated. Price $3.00.

Electric Railway Engineering, by C. Francis Harding, E. E. Second Edition. Published in 1916 by McGraw-Hill Book Company. 416 pages, illustrated. Price $3.00.

Electric Power Transmission, Principles & Calculation, by Alfred Still. 2nd Edition, revised, enlarged and rewritten. Just published by McGraw-Hill Book Co., Inc. 407 pages, illustrated. Price $5.00.

Elementary Principles of Illumination and Artificial Lighting, by Arthur Blok, A.M.I.E.E. Published in 1914 by Scott, Greenwood & Son. 235 pages, illustrated. Price 75c.

"Elements of Radiotelegraphy," by Ellery W. Stone. Recently published by D. Van Nostrand Company, 267 pages, 125 illustrations, 33 plates. Price $2.50.

Examples in Alternating-Currents, (Vol. 1), by F. E. Austin, B.S. Published in 1915. 223 pages, illustrated. Price $1.50.

Examples in Magnetism for Students of Physics and Engineering, by Prof. F. E. Austin, B S. Published in 1916 Price $1.00.

First Aid in Case of Electrical Shock, by Dr. John Woodman Published in 1908 by the New York Edison Company Illustrated. Price 50 cents.

Handbook of Machine Shop Electricity, by C. E. Clewell. Published in 1916 by McGraw-Hill Book Company. 461 pages, illustrated. Price $3.00.

International Library of Technology, Vol 11-B. on Electricity and Magnetism, Electrodynamics, Electrical Resistance and Capacity, The Magnetic Circuit, Electromagnetic Induction, Chemistry and Electro-Chemistry, Primary Batteries, Electrical Measurements, 585 pages, fully illustrated, half Morocco bound. Published by The International Textbook Co., 1905. Price $3.50.

International Library of Technology, Volume 14-C on Storage Batteries, Incandescent Lighting, Arc Lighting, Interior Wiring, Modern Electric Lighting Devices, Electric Signs, Electric Heating, 540 pages, fully illustrated, half morocco bound. Published by The International Textbook Co., 1905. Price $3.50.

Practical Electric Illumination, by Terrell Croft. First edition, published by the McGraw-Hill Book Co. 225 pages, illustrated. Price $2.50

Principles of Direct Current Machines, by Alexander S. Langsdorf, M. M. E. Published in 1915 by McGraw-Hill Book Company. 404 pages, illustrated. Price $3.00.

Principles of Alternating Current Machinery, by Ralph R Lawrence. Published in 1916 by McGraw-Hill Book Company. 614 pages, illustrated. Price $4.50.

Principles of Electrical Design—D.C. and A.C. Generators, by Alfred Still. Published in 1916 by McGraw-Hill Book Co. 365 pages, illustrated. Price $3.00.

Radiodynamics—The Wireless Control of Torpedoes and Other Mechanisms, by B. F. Miessner. Published in 1916 by D. Van Nostrand Company. 206 pages, 112 illustrations. Price $2.00.

"Radio Communication, Theory and Methods, with an appendix on Transmission over Wires," by John Mills. First edition, just published by McGraw-Hill Book Co., Inc. 205 pages illustrated. Price $2.00.

Radiation, Light and Illumination, by Steinmetz. Published in 1909 by McGraw-Hill Book Company. 304 pages, illustrated. Price $2.00.

Steam Turbines, by Kennedy. Published in 1910 by Whittaker & Company. 100 pages, illustrated. Price $1.00.

Telegraph Practice, a Study of Comparative Method, by John Lee, M.A. Just published, by Longmans-Green & Co. 102 pages. Price $1.00.

Telegraphy—A Detailed Exposition of the Telegraph System of the British Post Office, by T. E. Herbert, A.M. Inst. E.E. Third edition. Published in 1916 by Whittaker & Company 985 pages, 630 illustrations. Price $2.00.

Test Methods of Steam Power Plants—A Reference Book for the Use of Power Station Engineers, Superintendents and Chemists, by Edward H. Tenney, B.A. M.E. Published in 1915 by D. Van Nostrand Company. 224 pages, 85 illustrations. Price $2.50.

"Theory and Calculation of Transient Electric Phenomena and Oscillations," by Charles Proteus Steinmetz. Third edition, revised and enlarged. Just published by McGraw Hill Book Co., Incorporated. 696 pages, illustrated. Price $6.00

The Dynamo (2 volumes), by Hawkins & Wallis. Published in 1909 by Whittaker & Company. Price $4.00

"The New Competition," by Arthur Jerome Eddy, 6th revised edition, price $1.60.

The School of Practical Electricity (Electrician's Course in 2 volumes). Volume 1. Published by Electroforce Publishing Company, Milwaukee, Wis. 410 pages, illustrated Price $4.50.

The Practical Railway Spiral, by L. C. Jordan, C.E. Published in 1913 by Van Nostrand Company. 155 pages. Price 50c.

Wray's Manual of Car Lighting. Published in 1915 by Wray Publishing Company. 340 pages, illustrated. Price $1.25

ELECTRICAL NEWS, 347 Adelaide St. W., Toronto, Ontario

[illegible] Ward.

The [illegible] Electric Heating Co. have found their [illegible] rapidly that their present quarters at 544 Queen Street East are inadequate. They have now [illegible] additional floor space in the Wrigley building [illegible] the electric range manufacturing business will be transferred to the new location.

Contract will be let for electrical work on two $9,000 residences being built on Glenholme Avenue, by Mr. G. C. Mason, 320 Glenholme Avenue, Toronto.

Truro, N. S.

Contract will be let for electrical work on stores and offices being built on Prince Street, by Mr. H. K. Burgess, owner and general contractor.

Walkerville, Ont.

The Walkerville Land & Building Co. will let contract for electrical work on $150,000 office building being built on Sandwich Street, Walkerville, Ont.

Wardsville, Ont.

By-law authorizing a contract for power with the Ontario Hydro Commission, and providing for the raising of $8,000 for its installation were voted on recently and carried by an overwhelming majority.

Welland, Ont.

Messrs. John Deere Mfg. Co., Welland Junction, Ont., will shortly call for tenders for electrical work on $50,000 dry kiln, office and store-house which they are building at Humberstone Township, Ont.

West St. John, N. B.

The Vaughan Electric Co., Ltd., St. John, N. B., have been awarded the contract for electrical work on $35,000 C.P.R. waiting room at West St. John.

The contract for the supply of electric power for the pumping station between the city of Montreal and the Montreal Light, Heat and Power Company will be signed shortly, the terms having been agreed on between the parties and approved by the Water Board and the Administrative Commission. The chairman and assistant secretary of the latter organization have been authorized to sign the contract, which provided for the supply of a minimum of 4,000 horse-power per day with a maximum of 15,000 h.p. for a period of 25 years, at a rate of $25 per horse-power per annum.

An interesting comparison, showing the popularity of the telephone in Canada, has been made by officials of the Bell Telephone Company. Great Britain has two telephones for every hundred of population, the United States has 13.6 telephones per hundred, Canada has 10.8 per hundred, Sweden 6.4, Norway in 1917, 4.4; Germany in 1914, 2.2; France 1; Italy, in 1917, 0.3.

One of the latest trade novelties is an illuminated letter tray, from the handles of which is suspended an artistically painted shade, and in this way, when the business man enters his home, his attention is at once attracted to any mail which may be waiting for him.

The Bureau of Municipal Research, 189½ Church Street, Toronto, have issued an interim report on the Juvenile Court of Toronto and the relation of the Detention [illegible]

The Starr Elec. Co., Winnipeg, have been awarded the contract for the electrical work on the new warehouse of the T. Eaton Co., Ltd., on Donald St., Winnipeg.

If I Possessed a Shop

If I possessed a shop or store
I'd drive the grouches off my floor.
I'd never let some gloomy guy
Offend the folks who come to buy;
I'd never keep a boy or clerk
With mental toothache at his work,
Nor let a man who draws my pay
Drive customers of mine away

I'd treat the man who takes my time
And spends a nickel and a dime
With courtesy and make him feel
That I was pleased to close the deal,
Because tomorrow, who can tell?
He may want stuff I have to sell.
In that case then how glad he'll be
To spend his dollars all with me.

The reason people pass one door
To patronize another store ,
Is not because the busier place
Has better silks, or gloves, or lace,
Or cheaper prices, but it lies
In pleasing words and smiling eyes.
The only difference, I believe,
Is in the treatment folks receive.

It is good business to be fair,
To keep a bright and cheerful air
About the place, and not to show
Your customers how much you know;
Whatever any patron did
I'd try to keep my temper hid,
And never let him spread along
The word that I had done him wrong.

Trade Publications

The National Carbon Company, New York, have issued an interesting booklet entitled: "The Carbon Electrode." The booklet, which is illustrated, contains a good deal of information which will be found of real value to users of electric furnaces for the manufacture of steel and ferro alloys.

An interesting catalogue describing portable electric lamps with silk and parchment shades has just been prepared by the Baetz Bros. Specialty Co., Ltd., of Kitchener, Ont. One of the designs is shown herewith. There is no electrical equipment that makes a more acceptable Christmas present than a standard lamp.

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, has issued leaflet No. 3461, which describes and illustrates its automatic current regulator for electric arc furnaces with movable electrodes. Schematic wiring diagrams and photographs of detailed parts of this apparatus are produced.

The Wagner Electric Mfg. Co., of St. Louis, are issuing a little folder describing how one of their 1-8 horsepower motors installed in a basement to operate a small pump was submerged in dirty water for thirty-six hours, and started up again, without cleaning or drying, as if nothing had happened.

Electrical News
Generation, Transmission, and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MACLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 296 Broadway
CHICAGO - - Room 803, 63 E. Adams St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Entered as second class matter July 18th, 1914, at the Postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879.

Vol. 29 Toronto, November 1, 1920 No. 21

The Spirit of Co-operation Takes Fresh Hold in Canada

The spirit of co-operation has broken out afresh in the electrical industry in Canada, two very marked "eruptions" being the splendid conventions in Winnipeg and Montreal—the first on Oct. 14 and 15, and the latter on Tuesday and Wednesday of the following week. This activity follows closely on the formation of a co-operative electrical association in Vancouver, so that it now looks as if the co-operation movement is going strong.

Winnipeg and the Middle West were the last to fall in line, but having once got started they have apparently developed a tremendous momentum in a comparatively short time. Evidence of this is seen in the publicity campaign immediately preceding the convention, one feature of which was what practically amounted to "chartering," for one issue at least, the most influential daily papers in Winnipeg. As noted briefly elsewhere 15 full pages of the Winnipeg Tribune were taken up with announcements by prominent electrical interests doing business in that district, and this was supplemented by a quantity of good editorial matter. Nothing on so large a scale had ever been attempted in Canada before, nor, we believe, on the Continent.

A further evidence of the enthusiasm of the Middle West electrical fraternity was an attendance of upwards of six hundred delegates and guests at the evening banquet. It was a fine opportunity for planting some good electrical propaganda seed in the minds of some of the most important and influential citizens and, according to report, every advantage was taken of the opportunity.

It may be that the enthusiasm in Montreal was not quite so evident, but this was merely because, in that city, the condition of pure effervesence has passed and the electrical men have settled down to good hard work. The convention was entirely representative of the best elements in the industry and it is these, more particularly, who are putting their back into the organization that has just been formed. As is shown in the personnel of the officers, the big power companies in and around Montreal are solidly behind the movement and are determined that, in future, their best efforts will supplement those of the manufacturers, wholesalers, contractors and dealers, in making the electric industry perform its proper functions to the full.

Little by little electrical men are coming to see themselves and their industry in the true light. What was formerly called optimism has now become conviction. The electrical industry is pre-eminent. The sooner we become convinced of this elementary hypothesis ourselves, the sooner we shall be able to convince the rest of the world.

Big Factory Produces Same With Two-Thirds Staff

A prominent manufacturer, whose pay roll takes care of somewhere between twenty and twenty-five hundred employees, decided some time ago to lay off part of them until some of the uncertainties of the present situation should clear up. His first move was to let out five hundred. There was no noticeable difference in the production of the plant, however. Later he tried letting another three hundred go, and finally with a staff of approximately two-thirds of what it was three months earlier, this manufacturer finds both the quantity and quality of the output of his product practically what it was before.

There is a splendid lesson here for Canadian industries. That the cost of living for the average workman has gone up tremendously, there can be no question. Indeed, the argument that increase in wages has not kept pace seems to have some foundation, but this one case cited above, which is typical of many such experiences being related these days, indicates, we believe, that the fault lies very largely with "labor." "Labor" will not work. At most it has only been fifty to sixty per cent. as efficient as before the war—some estimate 40 per cent.—and this has been responsible, in a high degree, for the increased cost of living. The cost of labor is frequently seventy-five per cent. of the cost of a finished article, and if this labor is only fifty per cent. efficient, we at once account for 37½ per cent. of the selling price of the article,—equal to an increase in cost of 60%.

"Labor" thus holds the key to the situation. The question is—will they use it? Will they work as hard as they used to? On the answer to this question depends very largely the future trend of prices in general.

Open Way to Develop All Possible Power

From time to time we have urged the advisability of developing all possible power in the province of Ontario to meet the pressing needs of the present shortage. In our last issue we mentioned that certain steam plants might be made available, and that the Toronto Power Co. might use their stand-by unit at Niagara Falls to meet the emergency. It is apparent, however, that the situation with regard to the development of more power at the Falls is not clearly understood. One of the most influential Toronto daily papers, discussing the situation during the past week, has indicated that pressure should be brought to bear on the Toronto Power Company to make them develop more power. The writer of this article evidently was not aware that the Toronto Power Co. are prohibited by special act from developing any more power than they are developing at the moment. It is reasonable enough to suppose they would be willing to develop all the power they can sell, and as the demand is so great at the present time it is scarcely conceivable that any pressure need be brought to bear on this company to have them develop to their maximum capacity.

At the last session of the Ontario Provincial Legislature an act known as "The Water Powers Regulation Act of 1920," was passed, and whether or not it had this particular company in view, it most certainly has a very direct bearing on the condition existing to-day. This act is perfectly clear, and is worded as follows:

> "Where the owner is developing electrical power or energy by the diversion of the waters of the Niagara River under any contract, agreement, license, lease or other instrument, entered into by the owner or his predecessor in title or granted to the owner or his predecessor by the Commissioners of the Queen Victoria Niagara Falls Park, and the owner diverts or uses more water than he is entitled to divert or use, or develops or generates a greater amount of electrical energy than he is entitled to develop or generate under the contract, agreement, license, lease or other instrument, the inspector may with the authority of the Lieutenant-Governor-in-Council, give to the said owner notice in writing to cease diverting or using more water than he is entitled to divert or use, or generating or developing a greater amount of electrical power or energy than he is entitled to develop or generate, and if the owner, after the expiration of one month from the giving of the said notice, diverts or uses more water than he is entitled to divert or use, or develops or generates a greater amount of electrical power or energy than he is entitled to develop or generate, then every franchise or right of occupancy or possession or right to develop or use any of the waters of the Niagara River or to operate or construct any works which may be enjoyed by the owner thereof, and notwithstanding anything contained in any such contract, agreement, license, lease or other instrument or in any by-law or in any general or special Act of this legislature shall cease and be at an end.
>
> 15. The Lieutenant-Governor-in-Council may, at any time, rescind any order made by him under sub-section 2 of section 13 of this Act, and thereupon all right of the owner to develop power or use water or develop or generate power in excess of the owner's right, as found by the said Commissioners, shall cease, but any such rescission shall not relieve the owner from any penalties incurred by him under sub-section 3 of section 13 of this Act prior to the date of such rescission.

It would appear that the first essential towards getting extra power developed at Niagara Falls is the rescinding of this Act. If the Toronto Power Co. then refuse an order to develop all the power their equipment will carry, such pressures as are now suggested would seem more in order.

In 1915 Canada produced 921 million bushels of the five principal crops—wheat, barley, oats, rye, flax. This year she sets a new record with an estimated total of 934 millions.

Statistics on Electrical Manufacture and Distribution Entirely Inadequate

Montreal, P. Q.,

Editor Electrical News:

We have read with much interest the editorial in your issue of October 1st, dealing with the lack of detailed statistics covering the electrical industry in Canada.

For many months past we have been endeavoring to obtain data and acquire knowledge relative to the industry in which we are engaged, as it is our belief that such statistics are absolutely essential to manufacturers and jobbers throughout the Dominion. We have come to the conclusion, however, that such statistics can never be obtained without a united effort on the part of those concerned in the electrical industry .

We have approached the government, as well as various newspapers, periodicals, and associations with a view to learning what statistics are available, and finding that there are none, we have sent out appeals for co-operation so that we may make a united demand for the necessary information from the Dominion statistician in Ottawa.

At the outset, we would like to say that our inquiries have been treated with every courtesy by the Dominion Statistician, Mr. R. H. Coats, and his staff, and we are of the firm opinion that the Bureau of Statistics is anxious to assist manufacturers, wholesalers and dealers in every way possible, but, to be perfectly frank, up to the present no serious effort has been put forth by those in the electrical industry in their search for information. Mr. Coats has advised that he is quite willing to put up for discussion any reasonable recommendations at the next annual conference with the Department of Customs. Some recommendations already made by us will be considered, but it seems that the time is opportune to place before this bureau a detailed recommendation through an electrical journal. As you have led the way to a discussion, it is to be hoped that your paper will receive the support of the trade and be given a mission to perform for the ultimate good of all concerned.

Imported Products.

We have only to look into the detailed (?) information, as provided by the Customs Authorities to the Bureau of Statistics, to see how inadequate this information is for the use of those employed in the electrical industry and that it is impossible to use the figures given for any useful purpose whatsoever. See table on next page.

In addition to this list, we are advised by the Dominion Statistician that the United States trade returns for year ending June, 1918, show exports to Canada of certain electrical appliances which are not specified in the Canadian import trade classification, as follows:

Electric fans....	$130,935
Magnetos, spark plugs, etc.	490,258
Rheostats and controllers	81,619
Switches and accessories	251,122

Does it not seem perfectly reasonable that we should expect to find these lines listed in our own Canadian classifications.

A perusal of these imports specified by our Canadian Customs Authorities will show that of a total amount of imports for year ending March 31, 1920, of $17,042,764, practically forty-five per cent. is not classified, but shown as "Electrical Apparatus N.O.P." This apparatus, amounting to $7,435,239, is not otherwise provided for in classi-

Table 1—Imports of Electric Apparatus into Canada During the Year ending March 31st, 1920

Classification	Total Imports	Imports from United Kingdom	United States	Other Countries
Battery jars of glass and articles of hard rubber imported for the manufacture of electric storage batteries	$137,832	$298	$137,534	
Carbons over 3 inches in circumference and not exceeding 35 inches	632,581		632,581	
Carbon Electrodes over 35 inches in circumference	20,809		20,809	
Carbons, electric light, and carbon points of all kinds, n.o.p.	52,355	3,341	49,014	
Dental engines, electric	34,610		34,610	
Electric batteries, primary	124,833	332	124,501	
Electric batteries, storage	1,474,724	4,245	1,470,479	
Electric heating apparatus	112,157	1,009	111,148	
Electric light fixtures	732,020	3,846	698,879	29,295
Electric meters	280,868	37,222	243,252	394
Electric dynamos and generators	1,044,039	4,972	1,039,067	
Electric motors	1,976,703	18,342	1,956,639	1,722
Insulators, electric	614,523	768	612,105	1,650
Lamps, arc	9,719		9,719	
Lamps, incandescent	1,325,297	1,479	1,153,407	170,411
Sockets	142,748	28	138,312	4,408
Telegraph instruments	114,034	9,849	104,185	
Telephone instruments	653,517	3,523	649,994	
Transformers	124,356	1,238	123,118	
Electric apparatus, n.o.p.	7,435,239	88,981	7,311,499	34,759
Total imports	$17,042,764	$179,473	$16,620,652	$242,639

fication by the Customs Authorities, for reasons yet unexplained, and it is this non-classification which is the stumbling block to all endeavor to obtain what we are all after, i.e., an intelligent idea of the requirements in Canada of electrical apparatus and supplies, and what portion of these are imported into Canada.

If we look at the classified items we find that under electrical heating apparatus we imported $112,157, and in questioning this with Ottawa, we are informed that this includes electric heaters, toasters and irons, but are not told why such a classification should include electric irons. Surely, if the Customs Authorities can ascertain the number and value of irons imported into this country, it is not necessary to classify them with electric toasters. No mention is made of ranges and stoves, and we are not at all sure that the amounts as given under the heading above quoted are anywhere near correct, but are inclined to believe that the figures are absurdly low.

We could enumerate many lines which are omitted from the list, and cannot help but express wonderment at the absence of such commodities as fans, washing machines, dish washers, vacuum cleaners, etc.

We must draw the Customs Authorities' attention to the fact that, as yet, Canadian manufacturers are only manufacturing a portion of the electrical supplies merchandised in Canada, so that for statistical purposes, it is imperative that we know the quantity and value of imported articles.

Canadian manufactures of electrical apparatus and supplies, including telephones and wires and cables, in all, only totals around $35,000,000, and if we are importing $20,000,000 from the United States and elsewhere, members of the industry in Canada desire to know what these imports are, and only by obtaining the support of the Customs Authorities will they ever find out, and while, of course, we will realize that there will always be electrical parts which cannot be classified, we are not content with the present 50 per cent. classification which, at best, is none too easy to understand or believe .

As an instance, the writer some few days ago took up the matter of storage batteries, of which we are told we imported during the year ending March 31, 1920, in amount $1,474,724. The question raised was what portion of this amount covered power and light plants, and what portion would be storage batteries for automobiles, and the Department of Customs replied that this information was not available.

It is estimated that there are at present installed in Canada 12,000 power and light plants, representing an investment of approximately $6,000,000, and yet we are unable to find where these are or where they came from, or when they were imported, in fact, from a statistical standpoint, Ottawa has no knowledge of any such plants in Canada.

The above instances will serve to show how inadequate is the classification of electrical apparatus and supplies coming into Canada.

Canadian Manufactured Products.

Let us now turn to the statistics as provided by the Dominion Statistician bearing upon the manufacture of electrical goods in Canada.

We have given instances where the Customs Authorities are not giving the department support, but even in respect to Canadian manufacture of electrical goods, we are poorly served for information. For the year 1918 we are given figures covering the electrical industry which show that total manufacture for that year amounted to $30,045,399. This figure covers products at factory costs from 68 plants, which plants carried a total investment of $43,285,000.

Now for the year 1919 we have been endeavoring to obtain data for several months, and as recently as September 9th, we were informed that all figures for 1919 are not complete. With the permission of the Dominion Statistician we are, however, able to quote some of the figures given.

We are told that reports have been received from 85 plants with invested capital of $45,151,000, showing a total production of $33,915,504. These figures cannot possibly be correct. The year 1918 was a lean year for the electrical industry for various reasons, principally because of the war, which necessitated a large number of plants confining their whole energies to the manufacture of munitions. Building was at a standstill, as was construction of all kinds, and there was little opportunity for electrical development, and so we were content with the figures given for 1918, but in 1919 we were at peace again and things began to look brighter. Business picked up and factories resumed their manufacturing of their own products, so that 1919 was considered a good electrical year, and, quite naturally, we expected to see a big jump in the Canadian manufacture of electrical products.

For comparison, we will show the figures given for the two years, which are:

	1918 68 Plants	1919 85 Plants
Capital invested	$43,285,000	$45,151,055
Employees on salaries	1,681	2,070
Salaries..	2,304,000	3,060,202
Employees on Wages.	7,182	8,201
Wages..	6,150,000	6,549,413
Cost of fuel	497,000	432,167
Miscellaneous expenses	4,380,000	4,312,488
Cost of materials	13,780,000	14,919,102
Value of Products	30,045,000	33,915,504

Is it not obvious to all that there is something wrong in the interpretation put upon the questionnaires sent out by the Dominion Statistician to electrical manufacturers?

We are not of the belief that any part of Canada has reached a saturation point in electrical development and feel that if the matter is given the deserved attention, and members of the electrical industry can be brought together to confer and exchange ideas, there is no reason at all why we cannot obtain sound statistics, such as will serve those employed in this important work of development, and, in placing before the authorities a comprehensive outline of our requirements, we may quickly solve the problem of statistics and clear away the mist which hovers over this industry, giving us all a clearer vision of the boundless possibilities which exist in Canada.

The Electrical News gives us the opportunity of getting together on this subject, such an opportunity, in fact, that all interested parties should not miss. It only requires a few representatives of the electrical industry to frame up a list of requirements, for we feel sure that if proper presentation is made of those requirements, the Bureau of Statistics and the Department of Customs will gladly meet us and combine to give the electrical trade such figures as will be of immense value to manufacturers, wholesalers and dealers alike.

Cannot some united action be taken immediately so that by the date set for the Conference referred to we may be able to have a representative fully prepared and ready to present our requirements to a department which has signified its willingness to rceive and consider such requirements.

Yours truly,

F. W. JOHNSON,

Statistical Department, Northern Electric Company.

Important Industrial Topics Discussed at Illuminating Engineers' Convention—Resume of Most Valuable Papers and Talks

The fourteenth annual convention of the Illuminating Engineering Society, held in Cleveland, in October, was pronounced—by all who attended it—one of the most successful ever held. The list of subjects included in the programme was sufficiently varied to include something of value and interest to members connected with all branches of illuminating engineering.

The Automobile Headlight Problem.

The automobile headlight problem was attacked from a new angle in a paper on "A Survey of Voltage Conditions in Automobile Lighting." This paper brought to light the fact that many conditions are in existence tending to complicate the problem of maintaining the lighting equipment of cars in satisfactory condition and much of the inferior lighting is the result of poor design and construction of the various parts.

The greatest factor in the variation of illumination from a given type of equipment is the range of voltage impressed at the lamps. Measurements were made of the voltage of each lamp position on fifty-five cars of various makes and models. These measurements were repeated at five miles per hour steps at car speeds in high gear from 0-35 miles per hour with the various combinations of lamps ordinarily used. The voltage of the 3-cell lead battery-generator system was found to vary with full load from 5.5 to 6.6 The magneto system under similar load conditions produced voltages ranging from 2.4 to 7.4.

The candle power variation corresponding to these voltages were from 60-100 per cent. of normal with battery-generator and 0-190 per cent. with magneto systems. The range of candle power resulting from different makes and conditions of batteries was from 62 to 145 per cent. of normal. It was also found that in some cases more than 20 per cent. of the voltage was lost in the contacts of the system.

It is apparent that there is a need for greater standardization and better selection of generator and battery capacities for automobile lighting, further standardization of generator characteristics, improved design of switches and sockets and more rigid standards as to material and equipment.

Must We Again Modify Our Theories of Light?

Dr. E. F. Nichols, Director of Pure Science at the Research Laboratory of the General Electric Company at Cleveland, presented a paper on "Modified Views of the Theory of Light." Dr. Nichols reviewed briefly the two theories of the nature of light, the corpuscular and the wave, showing that up to 1890 there were no important known phenomena in radiation, with possibly one exception, for which the fully developed wave theory did not give some satisfactory explanation.

During the past twenty-five years, beginning with the discovery of X-rays the astounding progress in experimental physics has done much toward unsettling the conviction that the controversy concerning the nature of light was settled. The observation of X-rays has brought out facts that cannot be satisfactorily explained by the wave theory in its present form. We are thus forced to face the problem that Newton faced 250 years ago. The evidence—theoretical and experimental—about X-rays, convinces us that they consist of pulses differing only in one particular from light, that is, they are of vastly shorter wave length. X-ray pulses are probably one-half a wave length in extent and correspond to the crests of waves without the intervening troughs.

The hypothetical light corpuscles of Newton's speculations were supposed to be minute particles more like matter than anything else. The projectiles suggested by the observation of X-rays seem more like packages of concentrated radiant energy. The conclusion is that a modified corpuscular or projectile theory seems best to fit the facts that the wave theory does not account for.

Objective of Illuminating Engineering.

The subject of "Optical Principles of Illuminating Engineering" included some valuable data on the fundamentals of vision and their relation to illumination problems. The chief objective of illuminating engineering is to provide (1) efficient lighting, (2) of tasteful design, (3) at a reasonable expense. Good lighting produces good seeing conditions. Ideal lighting would approach daylight in intensity, distribution, direction and color. The illuminating engineer is chiefly concerned with the best compromise between seeing conditions and expense.

The human eye operates at its best, i.e., perceives slight differences in brightness and color most readily, where the brightness of the object viewed ranges between 1 millilambert (.002 candle power per sq. in.) and 1 lambert (2 candles per sq. in.) Between these limits the seeing is of nearly constant quality.

The four principal levels of brightness with which we are concerned are, roughly: exterior daylight, 1 lambert; interior daylight, 10 millilamberts; interiors artificially lighted .1 ml.; exteriors at night (full moonlight or moderate artificial lighting) .001 ml. The eye ceases to function (everything appearing dazzling) at 50 lamberts. The lower limit of vision is about 0.0000007 millilambert.

The eye operates best when contrasts in the field are not less than 2% nor over 10%.

The best ratio of diffused to total light appears to be between 30 and 60%.

For work requiring close discrimination white illumination is essential.

In direct sunlight the brightness of a sheet of white paper is about 10 lamberts, of snow 20 to 30.

Measurement of Reflection Factors.

The measurement of reflection factors, which has been one of the difficult and unsatisfactory problems in photometry, has been reduced to one of the simplest of all, requiring simple apparatus with no electrical instruments. Two papers were presented describing modifications of the same principle, utilizing a small sphere of 6 or 8 inches in diameter with a portion of its surface removed over which the test sample is placed. A small portable photometer is used to make the measurements. The measurements obtained are absolute values, i.e., not relative to any standard. Very small samples can be measured and these may be either matte or glossy.

A small hollow sphere is provided and a small segment of its surface is cut away, leaving a hole over which the test sample is placed. At another point on the sphere about 90 degrees from this is a small hole through which the opposite sphere wall is viewed by a portable photometer. The spot viewed is screened from the test surface by a small opaque screen. A small tube with a miniature lamp in the outer end projects a beam of light into the sphere by means of suitable lenses. This beam of light is first projected on to the test surface and a measurement is made. The beam of light is next directed on to the sphere wall and another measurement made. The ratio of these two measurements is the reflection factor of the surface tested.

The above method is subject to many modifications to suit the instrument to the convenience or ideas of different individuals. By using flashlight batteries it can be made entirely self-contained and very portable. In use it can be placed over surfaces to be tested, such as walls—painted or paper—or wherever the surface may be. This is considered one of the most valuable contributions to the subject of photometry for many years.

A New Photometer.

A new form of portable photometer of the precision type was described and shown. Its purpose is to bridge the gap between the former illuminometers, which are bulky, and the foot candle meter, which is not of sufficient accuracy for such requirements as the enforcement of lighting codes. This new illuminometer is entirely self-contained, battery rheostat and meter being assembled within the instrument. Its overall length is 12 in. and its maximum diameter 2⅛ in. Separate scales are provided for candle power, millilamberts and foot candles. The comparison device is a Lummer-Brodhun cube. A 3-cell flash lamp battery is carried in the sliding tube at the end of which is the ammeter and rheostat. The operation of rotating the ammeter varies the resistence of the rheostat. The range of the instrument is from 0.5 to 15 ft. candles which can be increased by the insertion of absorption filters to 0.005 to 1500 ft. candles. It has an accuracy comparable to that of existing portable photometers of the precision type.

Effects of Varying Intensities.

Very valuable information and data were presented on "The Effect of Variations in Intensity of Illumination on Functions of Importance to the Working Eye." The different functions tested were: acuity, power to sustain acuity, speed of discrimination and speed of adjusting the eye for clear seeing at different distances. The intensities under which the tests were made were 0.4, 2, 4, 6, 8, 12 and 36 ft. candles. The results of this research showed that substantial gains were obtained for each function as the illumination intensity was increased and that the gain was greater for defective eyes than for normal. There is also a strong probability that the middle-aged and the aged eye benefit more by increase of illumination than the young eye. The eye does not fatigue more under the high illumination than under the low. An interesting point brought out was that errors in refraction can be more easily detected at low illumination than at high. This is valuable to the ophthalmologist who can be guided in the illumination of his test charts, so that the greatest sensitiveness of his testing can be secured.

The value of this paper to illuminating engineers is evident, proving—as it does—the effect of high intensity of illumination on the ability of the eye to properly perform its duty.

The concept of the term "brightness" was discussed at considerable length. It was advocated that brightness is a psychological sensation and is not a physical property of luminous surfaces and that illuminating engineers should give more attention to brightnesses than to foot-candles. An illumination intensity of 2 ft. candles under one set of conditions might produce as much brightness as 4 ft. candles under another.

Illumination rated in terms of brightness gives a direct value of its suitability for the purpose required, but when rated in foot candles assumes a fixed visibility function and a known sensitivity. In other words, the foot candles tell us nothing as to the ability of the eye to see the brightness unless at the same time we know the appropriate visibility data of the eye under the working conditions. This principle can be applied to the working out of illumination problems so that the eye can work under maximum efficiency.

Improving Illumination of Old Buildings.

An excellent demonstration of ways and means to improve the lighting of old dwellings and residences was given. A survey of the lighting equipment of 1,500 dwellings in Chicago resulted in some astonishing conditions being brought to light. The dwellings investigated included all classes, from those of the wealthy to the most humble homes of the laborer. The insufficiency of wall receptacles is responsible for most of the unsightly and risky array of dangling cords.

In the dwellings [illegible] the [illegible] was secured but one wall receptacle was provided for every 17 rooms. In nearly all of the dwellings the houses are rented to the occupants. The fixtures are usually part of the house equipment and the tenants as a rule accept the conditions as they are and nothing is done to improve them. The expense necessary to remodel the wiring is, as a rule, prohibitive.

A few of the methods of improving the lighting conditions without any addition to the wiring were demonstrated. The improvements were to the lighting conditions as well as to the appearance. Most of the improvements were accomplished without changing the glassware. By the addition of silk covers for unsightly glassware and by providing suitable multiple plugs for increasing the number of outlets, an unattractive and inconvenient installation can be transformed so that the whole appearance of the room is pleasing and the addition of outlets by means of gang receptacles on the table can be accomplished in a manner that does not render them unsightly.

There is a very wide field for such a campaign as the one described. The methods prove conclusively that the perpetuation of the very low standard of lighting of rented dwellings is not necessary and that no alteration to the wiring is needed to effect a large improvement.

The very popular lighting unit, the floor lamp, is marketed in a large variety of styles and types, the chief aim of which is ornamentation. A very few types are designed on scientific principles. The difference in the light distribution from floor lamps range from nearly all direct (downward) to all indirect (upward). Results of tests—on 25 observers—to determine the most pleasing proportions of direct and diffuse light were given. The judgment of the observers was based on the most pleasing effect. A 200 watt gas filled lamp was used in the tests. The results indicated a preference for about 10% of the light to be direct, the remaining 90% being indirect. This condition is impossible of attainment with the great majority of the floor lamps on the market today. These results apply equally well to a great many table lamps.

Industrial Lighting.

Industrial lighting, always an important branch of illuminating engineering, was dealt with from several angles. A number of out of the ordinary installations were described that illustrated the need of a certain amount of mechanical ingenuity in overcoming difficulties caused by features of construction. In one situation where cranes made cleaning difficult the lighting units were suspended above the cranes by hooks and connections to the feeders were by stage connectors. The advantages of this method are obvious. Units suspended from a trolley wire could be moved across the bay by sash cords to allow them to be placed to the best advantage for lighting large machines. In some cases where illumination is needed on vertical surfaces, crossed beams from angle reflectors are more suitable than the ordinary type. Flood lighting units are used to light areas where large machine tools are placed in open bays where general lighting is satisfactory for the surrounding areas. Flood lighting units on crane cabs, adjusted by the operator, serve a very useful purpose. Grain elevators and places where explosives are handled can also be safely lighted through openings in the roofs and walls by flood lights. The evils of drop cords are minimized by supplying take-up reels so that the free length of cord is reduced to a minimum. Adjustable lamps (with reflectors) are mounted on pipe frames with telescoping uprights and horizontal pieces sliding through tees. Counterweighted arms with lamps on the free end allow the lamps to be put up out of the way when not in use.

The use of light green paint was advocated for walls where the workmen must face them. The green is less glaring than white.

Regarding the economy of daylight in large mills, it was stated that window area costs twice as much as wall construction, the heating costs twice as much, due to the radiation of heat through the windows and as a consequence the lighting by means of large window area costs about twice as much as artificial light when the walls are continuous.

Lighting of Shoe Factories.

"The Lighting of Shoe Factories" was the subject of a paper that explained the methods of meeting the problems peculiar to this industry. Much of the shoe-making machinery has overhanging parts at the place where the work is done. This ordinarily makes overhead lighting difficult. Added to this is the placing of important machines near the windows to make the best use of daylight. It has been found that in the factories where the laying out of the machinery and the lighting system is done in co-operation, localized general lighting gives good satisfaction. High intensities are required because of the low reflection factors of the leather.

During the war when production was of vital importance fairly high intensities were resorted to in an effort to increase output. Some very valuable lessons have been learned in this regard. High intensity has proved itself a good investment and the tendency is towards still higher intensities. How far this will be carried remains to be seen. All of the so-called high intensity installations so far have resulted in economy of plant operation. Engineers seem to be taking a sort of perspective view of the situation and are wondering how high the intensities must go before the cost ceases to produce greater economy of production. This limit has not yet been reached. Where, a few years ago, 10 foot candles was considered sufficient for fine manufacturing, 15 to 20 ft. candles are now being supplied for ordinary operations and for fine work intensities well above 20 ft. candles are supplied.

Store Lighting.

A survey of store lighting in some of the large cities revealed the fact that stores are rather poorly lighted. Some stores resort to temporary installations of high intensities for stimulating sales in certain departments. The chief reason for the existence of poor conditions seems to be that the store managers have not been presented with the facts.

The cost of installing more up-to-date fixtures is also a large factor in the situation. To meet this condition one central station company standardized a few types of fixtures suitable for use with gas filled lamps. These units were of good appearance and design from the standpoint of illumination and maintenance. They permitted high efficiency lamps to replace the older vacuum lamps with very little alteration to the old equipment. A new device for automatically cleaning semi-indirect bowls is worthy of mention. A thin metal squeegee with a felt surface conforming to the contour of the bowl is pivotted at the centre of the bowl. Each unit is controlled by a pull-chain switch and each pull of the chain to light or put out the lamp causes the squeegee to make a complete revolution of the bowl, thereby removing all dust. This fitting does not mar the appearance of the unit.

The Use of Color.

"Some Recent Applications of Color in Lighting" described methods that are being used in all classes of interiors where utility is not the only consideration. This is an ever-widening field. A notable example is the modern use of the crystal chandelier of the time of Louis of France. By the use of concealed silvered glass inverted reflectors and pendant lamps within the fixture the fixture loses none of its style while at the same time it is thoroughly modern. The decorative value of the rows or clusters of candles is re-[illegible] and other effects can be [illegible] as desired.

One-Man Safety Car Meeting Approval on Many Canadian Systems

Thirteen Towns and Cities Already Operating Them Wholly or in Part—Particularly Applicable to the Smaller Cities—Platform Expenses are Reduced, Accidents Almost Unknown, Schedule Maintained, Many Commendations and No Criticisms

No public utility has been harder hit by the conditions of the past six years than the electric railway.

There are many causes for this, some of which were not clearly anticipated either by operators or investors until the results began to be apparent. First of these perhaps is the feeling of the general public—as universal as it is illogical—that a "nickle" and a street car fare are one and the same thing. Precedent no doubt has much to do with this feeling. Street railway fares, for some reason, have always been fixed by franchise though such a course has never been common in other utilities. It has thus been found the most difficult thing in the world to get the public to see the justice of adequate fare increases.

Compared with other public services, too, the increase in cost of operation has been greater for electric railways than in the others; this is due largely to the very high percentage of operating costs to gross income on account of the big items of labor and maintenance. Then there has been the incompetence of labor to contend with, the ever-increasing competition of the motor car and finally and as a result of it all, the difficulty of financing new enterprises.

Aside from the very small proportion of the general public who are investors in traction stocks it is doubtful if the situation as it exists today is at all clearly understood. The evidence is shown in different ways, however,—for the most part in two ways. First, where the railway systems have not been tied up tight by franchises the fares have been greatly increased, and second, where the stocks of franchise companies are listed and quoted on the stock exchange the evidence appears in the form of greatly reduced quotations. Thus we have municipal systems that formerly operated on a five-cent fare now charging twice that much, and many private companies, tied up by long franchise agreements, the value of whose stock, judging by the quotations, has been reduced to one-half or less.

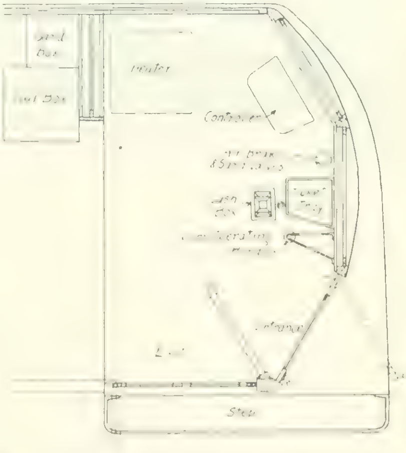
In the face of these difficulties many tramway systems have been crippled and are unable to provide an adequate service for the public. From everybody's viewpoint this is bad business. A good transportation system—rapid and comfortable—is as much a factor for efficient work on the part of the average citizen as is good housing and good food. Crippling the transportation system of a town or city is crippling the citizens themselves, their homes and their industries. It is a penny-wise-pound-foolish policy that sooner or later will inevitably bring disaster and condemnation.

How should the situation be treated then? The answer is surely easy. (1) Effect every possible economy in operation and (2) fix a fare that will keep the system in fit condition to give adequate service. This opens a very wide field, but in the present article we are confining ourselves to only one item of economy, viz.: the one-man car. Much has been claimed by the manufacturers and users of these cars in the United States, but so far as we are aware no summary of the opinions and experiences of Canadian tramway men has ever been published. Briefly it may be said that about one-third of the Canadian tramway systems use one-man cars either wholly or in part, and of this number there is no single evidence that they are not giving very excellent service. Indeed the testimonials, quite unsolicited, in favor of these cars has been a matter of surprise and must also be a matter of gratification to those who have used these cars or advocated their use.

The different towns and cities of Canada in which one-man cars are being used either wholly or in part, are as follows. Calgary, Alta.; Cornwall, Ont.; Cape Breton, N.S.; Edmonton, Alta.; Halifax, N.S.; Lethbrodge, Alta.;. Levis, P.Q.; Moose Jaw, Sask.; Peterboro, Ont.; Sherbrooke, P.Q.; St. Thomas, Ont.; Three Rivers, P.Q.; Toronto Municipal.

Calgary

The city of Calgary was one of the earliest to adopt this arrangement, and the McCauley car, which was the invention of the former general manager of the Calgary Municipal Railway System, has not only proven its value in that city, but has been widely copied at other Canadian points. Mr. R. A. Brown, the present general superintendent of the Electric Light and Street Railway departments, gives the following interesting information:—



Plan of front vestibule of McCauley car used in Calgary, Moose Jaw and other cities.

"We have several types of cars, the long and short vestibule, double truck cars and the short vestibule single truck cars. All of them have been changed over for one-man operation, according to the McCauley System, and are operating very successfully.

"The difference between the McCauley car and other one-man cars is that the McCauley car has two doors to the front vestibule—one for entrance and one for exit. In the case of long vestibule cars very little alteration is necessary. Two doors are put in the front vestibule instead of one. In the short vestibule cars, the alterations are made according to enclosed plan. The frame is brought around square with the side of the car and one of the front panels of the vestibule is used for the entrance door. The doors are operated by levers from an operating rod near the motorman. Our single truck cars only have one door for entrance and exit as the vestibule was too short to make the changes which were possible in the double track cars.

"As far as operation is concerned, we have found the one-man car very satisfactory. They may be a little slower during the rush hours and in congested districts than the two-man car, but very little. The double door for the front vestibule is, I believe, an improvement over the arrangement used with the safety car. Considerable time is saved when passengers can board and leave the car simultaneously. The **one-man car has also decreased the number of accidents due to boarding or leaving the car.**

"The motorman-conductors of the one-man cars are very much busier than the platform men of the two-man cars, and in Calgary we have done everything possible to lighten their labors and make things convenient for them. The heaters are placed as shown with the coal and sand box near by; the air brake and air sand valves are together. The cash box is mounted on a pipe frame at the motorman's right hand and close to entering passengers. A ticket tray is provided for holding a supply of tickets and transfers. The doors are operated by levers from a pipe support and the handles are arranged so that either or both doors can be opened or closed with one hand. Some of our cars are fitted with a solid step and some have folding steps which open or close up when the doors open or close. Air whistles and foot gongs beside the usual push switches are provided. Track switches are thrown by the motorman from the platform by means of pinch bars inserted through holes in the platforms. Last June the fares were raised to 4 tickets for 25c or 18 for $1.00 and the cash fare was made ten cents. This has had the effect of reducing the cash fares to practically nil and relieves the motorman from making change except for selling tickets.

Moose Jaw Electric Railway One-man Car—Note separate doors for entrance and exit which makes for faster schedules. This car also has emergency door at rear.

"The seating arrangement and rear vestibules are similar to other one-man cars. The rear vestibule is fitted up as a smoking compartment, as all our cars are of the single end type. An emergency exit is provided in this rear vestibule.

"We have recently made changes in the position of the fare box, shifting it from a position at the back of the motorman to the front and just to his right. This we find makes the collecting of fares easier than the other location."

Cornwall

Cornwall, in Eastern Ontario, has seven one-man safetys. Mr. W. L. Macfarlane, superintendent of the railway company, reports that he has found them very satisfactory, and states that they are a big advantage in taking care of conditions as they exist in the small town. The only objection that could be raised to them is that on special occasions they might not handle a crowd as advantageously as the larger cars.

Cape Breton

The Cape Breton Electric Railway operates two standard Birney one-man cars, and two re-built "safety" cars with all safety equipment such as air brakes, air operated doors, folding steps, controller with dead man's handle, etc., and are at the present time planning to add more. The manager of this company, Mr. C. C. Curtis, states that they have found the Birney safety car satisfactory in every way.

Edmonton

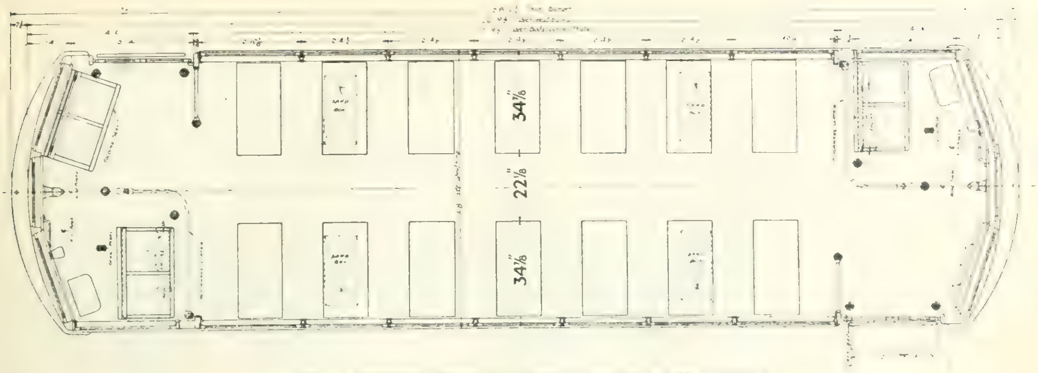
In Edmonton they have re-built their double truck cars, closed up the rear ends, with the exception of an emergency door and operate by one man. This reduces the platform expense, but as these cars are not specially equipped with all modern safety devices, they cannot strictly be called safety cars. Mr. W. J. Brunlees, superintendent of the Edmonton Radial Railway System, states that he is strongly in favor of lighter built cars, simply designed, properly equipped with time and labor saving devices for small cities. He adds that in the future he hopes some may be placed in operation in Edmonton to prove, as he says, "that street cars are not a thing of the past (as some imagine) but a necessary utility."

Halifax

In the city of Halifax, N.S., the Nova Scotia Tramways and Power Company have installed twenty-four safety cars of the Birney type to date. They report them extremely satisfactory in every way, and state that when additional equipment is required they plan to purchase more safety cars.

Lethbridge

The city of Lethbridge, Alta., was a pioneer in the use of one-man cars. Mr. Freeman, Commissioner of Public Utilities of that city, has very kindly outlined the results of their long experience, and among other things particularly



Plan of double-end Birney Car—Seating Capacity for 32 passengers

emphasizes the point that their accidents have become almost negligible. Mr. Freeman says:—

"The one-man car is the greatest move that can be made towards the more economical operation of the street car systems of the world, and while the change will of necessity meet with opposition from labor and all sorts of objections will be made as to safety, etc., our experience after eight years goes to show that notwithstanding the ever-increasing hazard due to auto traffic, **our percentage of accidents has become almost negligible.** When we adopted the one-man car system we reconstructed our cars by turning them around to put the larger vestibule at the operator's end. This enabled us to put in entrance and exit doors and so divide the vestibule that incoming and outgoing passengers do not interfere with each other.

"We, at the same time, adopted the pay-as-you-leave system, and the exit door and cash box are next to the motorman, where he can conveniently see that fares are paid and give transfers. The great advantage of the pay-as-you-leave system is particularly noticeable in cold and inclement weather when passengers are more or less encumbered with wraps, muffs, and heavy clothing, and cannot readily get at their change or tickets, necessitating unnecessary delay. With our system, passengers are enabled to get their change or tickets ready in comfort, thus obviating one of the causes of slow service.

"To conclude, I would say that it is only a matter of time when the one-man-car will be the universal system, excepting in special cases, and that the idea of extra hazard will be entirely disproved.

"Summed up, our experience is.—

1. The platform expense is practically cut in half.
2. The number of accidents is reduced.
3. The service is just as fast and in some cases faster."

Levis

The Levis County Railway System, Levis, P.Q., Mr. H. E. Weyman, manager, first started to try out one-man cars towards the end of 1916, by converting and rebuilding an old single truck car. This was found to be satisfactory so far as operation by one man was concerned, and they later converted a double truck car which also proved satisfactory, handling loads of 100 and over. Mr. Weyman states that this is in spite of the fact that their railroad profile is probably the most severe in Canada, including also a number of curves in addition to which the winter conditions are exceedingly severe. The experience of the Levis County system during the last eighteen months is outlined by Mr. Weyman as follows:—

"Eighteen months ago we decided to equip our system with the new Birney safety car, which is the standard design, but is fitted up specially for winter operation in this climate. These cars were put into operation on September last year, so that we have had one year's operation. They operated all through last winter in the most severe snow and weather conditions and have proved to be as satisfactory as the old single and double truck cars as far as operating capabilities are concerned. We have, of course, the additional saving which these cars can make over the old style, in operation.

"In operating in this district in the winter, especially in Levis district, it is absolutely necessary to combat the snow with the proper machinery and on a scientific basis. Years ago we attempted to operate our passenger cars and snow fighting machinery in a somewhat similar manner to that in use in other cities in Canada and the United States. In other words, the passenger cars were permitted to buck the snow. This resulted in a complete collapse of both passenger and snow equipment. We now do not permit our passenger equipment to buck snow. This applies to the old cars which were in service before we obtained our safety cars. Our snow equipment is out to work as soon as the snow begins to fall and is withdrawn immediately if the fall is not very much. However, in this district when we have a snow storm it is generally a good fall. I would say that the snow fall itself is really a minor trouble with us—the real trouble is the high winds and cold, which generally prevail with the storm and afterwards. Under these conditions we found last winter that our safety cars operated equal, if not superior—in fact I would say superior—to the double truck, four motor equipment, 40,000 lb. car.

"Referring to the electrical equipment, it is necessary in winter to block up the ventilating ducts in the new motors to prevent snow from being sucked in. This applies also to the drain hole at the commutator or suction end of the motor.

"The weight of our car equipment with its winter clothing, including a small snow flanger on each end of the car, of special design and built by ourselves, is 15,400 lbs.

"We are able to say that the new Birney safety car is able to operate under any conditions and in any size of city, except where the headway limits the number of cars and the traffic density is too great on this account.

"Any attempt to say that this car will not operate on account of conditions, except as stated above, will be for want of confidence in the human being and not the car."

Moose Jaw

The Moose Jaw Electric Railway Company, Moose Jaw, Sask., have been operating one-man safety cars since October, 1919, and have now all their cars converted, which means a total of 16. They use the McCauley type of car, that is, they converted the two-man type by using the Mc-

One of the eighteen Safety cars operated by the Three Rivers Traction System. The idea of separate entrance and exit is carried out here also and the motorman-conductor has a little compartment of his own

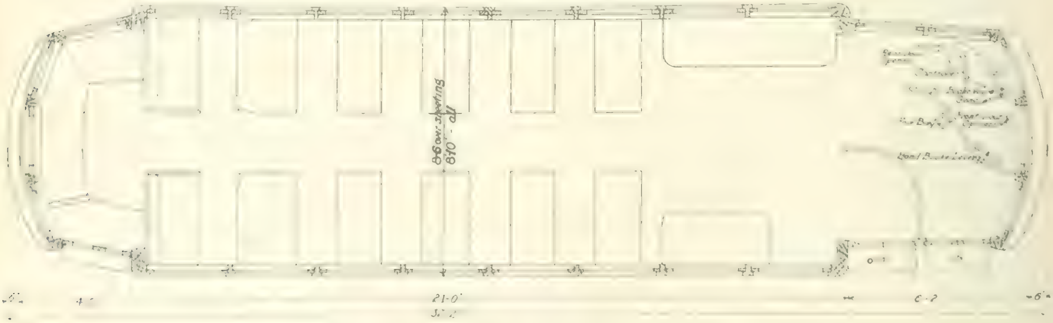
Cauley patents, introducing an additional door in the front of the car, making both an exit and an entrance. (See illustration in this issue.) This was done at small expense and with very little operation. Mr. A. H. Dion, superintendent of the Moose Jaw Electric Railway, advises they have found the operation of the safety car "perfectly satisfactory in every respect," and that they can keep up the same schedule as was formerly followed by two-man operation, and at much less cost. Mr. Dion outlined the experience of his company as follows. The information will be valuable to tramway officers who are endeavoring to have the same type of car installed on their own systems:—

"Before it was possible to operate one-man "Safety" cars here in Moose Jaw it was necessary to have a by-law passed by the citizens and before this by-law came up for voting, model safety cars were put on the different lines for a period of three weeks, giving the public sufficient time to acquaint themselves with the car and to understand perfectly what they would be called upon to vote upon. The by-law passed with a very considerable majority. We have had very few complaints relative to one-man operation other than the usual complaints; in fact, we have very much fewer complaints made by the public since inaugurating the one-man car with one man in charge of same. We find further that the employees take a greater interest in their work and are more careful, as before when a question of blame arose it was impossible for it to be shifted from the motormen to conductor or vice versa.

"With this type of car loading and off-loading is greatly facilitated, there being no congestion whatever, and in the writer's opinion the only drawback to some one-man cars is the matter of congestion due to the inability on the part of the operator to make change quick enough. Upon introducing the one-man system we found that any congestion that took place was due to this item, and in consequence we have developed a change-maker—a very simple contrivance which the operator has on a table before him which enables him to make change immediately to those not having the exact fare. This is particularly true where anything but a straight five-cent fare is involved. For instance, without some facility for quick change-making an operator is very greatly handicapped and considerable delay is experienced where, for instance, it is necessary to make change for, say a six, seven or eight-cent fare, as we found that an average of one out of three persons, where coppers are concerned, would not have the necessary or proper change ready.

We have found also that with one man in charge of a car our cost of upkeep and maintenance is considerably reduced and that platform accidents have been very greatly reduced, in fact have been almost rendered impossible. Taking all in all, the writer would say that the one-man car is perfectly satisfactory provided that a car is equipped with an exit and an entrance at the front and some method of assisting the operator to make change quickly. One feature of our cars which appeals very strongly to those travelling is that the rear vestibule is completely closed with an emergency door which can be opened from the inside by anyone at any time and seats are provided around this vestibule converting same into a smoking compartment.

"In reply to your question as to whether we are considering converting any more one-man cars would say that at the present time we do not intend doing so, but that di-



Plan of Three Rivers one-man Safety—Separate entrance and exit rectly as the traffic warrants same we will increase the number. Besides saving in pay roll there is a considerable saving due to the smaller number of uniforms and outfits necessary to be purchased and further the fare collection being always in full view of the travelling public we have experienced a diminishing of uncollected fares.

"The type of car used by us is the single truck standard Brill model mounted upon a 21E Brill truck as manufactured by the Ottawa Car Company with an overall length of 33 feet. The inventor of the patents of this car is Mr. Thos. H. McCauley, who was heretofore superintendent at Calgary, Alberta, but who is now in the city of St. John, New Brunswick, converting I understand, that system to a one man system."

Peterboro

The Peterboro Radial Railway System are operating two one-man safeties. Mr. L. G. Ireland, manager of the system, states that they find them very satisfactory, and prefer them to any other car they are operating on their system.

Sherbrooke

Mr. F. X. Couture, superintendent of the Sherbrooke Railway and Power Company, reports that they have been operating one safety car and are installing another. These are of the Birney type which, Mr. Couture states, "have given entire satisfaction."

St. Thomas

The experience with one-man cars in St. Thomas, Ont., only dates back two or three months, but the report already is that "safety cars are the only cars for small roads. We are getting good results, and the public are taking to them. Educating the people to have their fares ready is our biggest problem. We are putting tickets out among the stores so that the public can get them at any time or place." Seven safety cars are operating on this system to date, and more of the same type will be added.

Three Rivers

The Three Rivers Traction System is entirely equipped with safety cars to the number of eighteen. This system commenced operation toward the end of 1915 with six safety cars manufactured by the Ottawa Car Company. Repeat orders for the same type of car have been placed since from time to time, and the company is also operating three safety cars known as the "Bosenberry" type, built by the St. Louis Car Co. of St. Louis. These are much lighter cars, apparently too light, in the estimation of the Three Rivers Traction Company as, in placing recent orders, they have returned to the Ottawa car type as being most satisfactory for their conditions. Mr. R. J. Beaumont, general manager of this company, states that "additional equipment when needed will be of the safety car type." A photograph of the standard Three Rivers car, and also a plan showing the seating and equipment layout are shown in this article. The general dimensions of the cars are as follows: length of body, 21 ft.; front vestibule, 6 ft. 2 in.; rear vestibule, 4 ft.; length over bumpers, 32 ft. 2 in.; width of car bumper, 8 ft. 6 in.; seating capacity, 36. The car bodies are of semi-convertible type; wood construction; single-end control; eight double sash windows on each side of the body, the top sash being stationary and the bottom one made to raise and lower; interior trim red cherry; no bulkheads at either end. The front vestibule extra long, and step opening extra wide, so that, entrance and exit can be made by it. Each opening has individual folding door and step operated by the National Pneumatic Company's air engine, and so arranged that the motorman can operate them singly. Vestibule is equipped with brass p.a.y.e. rail dividing entrance and exit and motorman's compartment. A fare box is attached to the entrance rail with a light arranged to illuminate the box.

The rear vestibule is semi-circular with an emergency exit door controlled by the motorman from his position in the front vestibule. It is equipped with a semi-circular seat which accommodates five people. The heating system is regulated by thermostat which relieves the motorman of any thought about this item.

Toronto

A number of cars have been tried out for about two months on the Toronto Municipal System and, though the Commissioner of Works, Mr. R. C. Harris, has not yet reported on them, there is every evidence that they are meeting with public favor. Toronto is the only large city in Canada where these cars have been tried out, and it is not suggested that they will ever be in a position to take care of the very greatly congested traffic which has to be handled at rush hours in a city of this size.

The Nelson Tramway System, Mr. G. T. McGuire, superintendent, report that they have not yet installed any safety cars, but are endeavoring to do so. Mr. McGuire has been gathering information on the subject, and believes it is the only method by which their system can be made to operate at other than a loss.

Mr. D. W. Houston, superintendent Regina Street Railway System, expresses himself similarly, and says: "I strongly favor one-man car operation here, but have been unable so far to get the consent of the majority of the electorate, which is necessary in this province."

The Sandwich, Windsor and Amherstburg Railway System is considering the installation of safety cars, and Mr. McCauley, the manager of the St. John Railway Company, is planning, we understand, to change over to safety cars as rapidly as possible.

The Evidence of Statistics.

In all this evidence we realize there is very little of a statistical nature to back up the statements of the various managers and superintendents, but this seems to be a case where figures might only confuse the issue. The real point is that everywhere in Canada where one-man cars have been tried, they are found satsisfactory. All the opposition seems to come from men who have had no experience with them. For the most part this opposition comes, directly or indirectly, from employees of the street railway system, but that is merely a personal matter and not an argument against. The attitude of "labor" throughout history has been, in the main, opposition to economies that might replace manual operations.

Just as a suggestion of the actual economies in dollars and cents, however, we quote from a paper by F. L. Andrews, of the Railway & Traction Engineering Department of the General Electric Company. Mr. Andrews places the cost of operation of the average two-man system at 21.95 cents per car-mile, basing his conclusions on the operation of eleven representative roads. This is made up as follows:

	Cents per car mile
Maintenance of way and structure	[illegible]
Maintenance of equipment	2.14
Power	[illegible]
Conducting transportation	8.7
Conducting traffic	[illegible]
General	[illegible]
Undistributed	1.93
	21.95

Mr. Andrews then goes on to state that the three items on which there is most saving will be maintenance of equip-

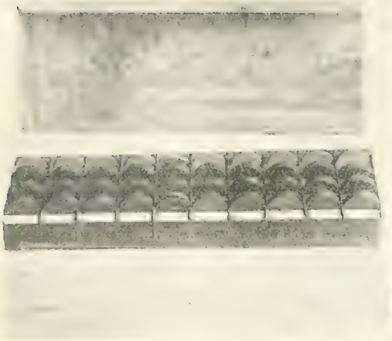


Fig 1—Change maker loaded with cover standing above

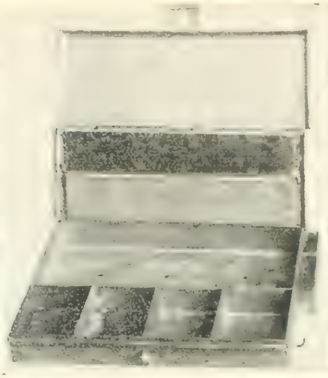


Fig 2—Metal till as it is mounted on front of the car.

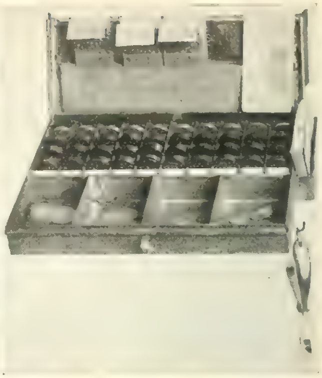


Fig 3—Metal till with change-maker in place, and tickets, transfers and punch as in usual operation.

ment, power and platform expenses. Comparatively, these figure out thus:—

	Cents per car-mile	
	Two-man operation	Safety Car operation
Maintenance of equipment ..	2.14	1.2
Power	4.2	1.95
Platform	8.7	4.8
Total ..	15.04	7.95

Another considerable item is in the capital cost and the interest on investment.

An Efficient Change-Maker

Mr. A. H. Dion, superintendent of the Moose Jaw Electric Railway Company, expressed the opinion that the only drawback to some one-man cars is the congestion caused by the inability of the operator to make change quickly enough. When the Moose Jaw system started operating one-man cars, Mr. Dion found that any congestion was due to this cause. As a result, they developed a simple change-maker which the operator places on a table before him and which enables him to make change immediately to those not having the correct fare. Mr. Dion was so good as to have a photograph taken of this change-maker which we reproduce herewith. Fig. 1 shows the change-maker loaded, with the cover standing above. Fig. 2 shows the metal till as it is mounted on the front of the car, and Fig. 3 shows the metal till with change-maker in place and tickets, transfers and change as would be the case when the car is in operation.

A more complete description of this change-maker is given below in Mr. Dion's own words:—

The change-maker as used by us consists of ten slots in a row simply separated by a thickness of light sheet metal and four rows running parallel separated by approximately one-half inch, making up a box of about nine inches long by about four and one-half inches thick. This size will be materially reduced by the introduction of our new copper cent. This box is designed for use upon the basis of a six-cent fare.

In the first row of slots we have coppers on edge five in each slot. This is to give change quick to a passenger requiring change for a five-cent piece, the operator simply picking up a stack of five coppers between his index finger and thumb and depositing them in the palm of the passenger. This is a matter of seconds.

In the second row of slots we have five coppers with a Canadian five-cent piece between; this makes change for a ten-cent piece enabling the passenger to deposit correct fare.

In the third row of slots we have five coppers, two five-cent pieces and a ten-cent piece distributed between the coppers; this makes change instantly for 25c., enabling the passenger to pay correct fare of 6c upon entering the car.

The fourth row of slots carries change for one dollar on the basis of a passenger requiring a strip of six tickets valued at 35c. This slot is made up of two Canadian quarters, a ten-cent piece and a five-cent piece (65c), the ten-cent piece and five-cent piece being between the two quarters. This is picked up between the index finger and thumb and is given to the passenger at the same time a strip of tickets is given, thereby making up the dollar.

This layout we have found is of sufficient size to take care of any run on the operator and is replenished by him as he proceeds along the route or at any place he pulls up.

This change-maker is set in a tray in front of the operator. This tray has a hook to carry his punch, and a receptacle to hold a package of transfers. The cover of this tray folds back and has strips along the inside of same in which are carried strips of tickets. In the front of this tray are four small tills in which the operator deposits the money received from passengers for which he has made change. In this way the operator has no reason to have recourse to his unhandy pockets, as everything is under his fingers.

Another very important feature in regard to this change-maker is at the time when the shift of crews takes place. This enables the operator on duty lifting out his change-maker containing the money and slipping a close-fitting cover over same. This readily fits into his pocket. The on-coming operator simply removes the cover from his change-maker and drops it into place and in the matter of a second is ready to make change for on-coming passengers.

This has worked out very successfully, but since using same upon the above basis it has been materially improved and instead of using so many coppers, tokens are used in their place. For instance, a metal token say of the same size as our new copper cent and of a distinctive color of metal is used "Good for one fare." For example with the using of tokens on the basis of a six-cent fare the box would be made up as follows: the first row would be the same, containing five coppers, being change for a Canadian nickel. The second row would be made up of one token and four coppers, which would enable the passenger to pay his fare as he entered, retaining the four coppers as his change. The third row would contain one token, four coppers, a ten-cent piece and a five-cent piece. The fourth row would be the same and other rows of different denominations of change could be added to suit the different requirements of the road served.

The Contractor-Dealer

Winnipeg Electrical Men Establish Record in Publicity Work

Nothing that has been done before in the way of co-operation, by the daily press, with the electrical industry, approaches the issue of October 14th of the Winnipeg Evening Tribune. This issue contains five and a half full-page advertisements by the City Light & Power Department; Great West Electric Co., four pages; the Westinghouse Company, the Renfrew Electric Co., the Canadian General Electric Co., and the Northern Electric Co., each one page, and the Hoover Company, the Sibbald Electric Co., the Winnipeg Engineering Co., the Schumacher Gray Co., and McDonald & Willson each one-quarter of a page. These advertisements all in prominent type and with attractive illustrations, displayed the advantages of the greater use of electricity in the home, the office and the factory.

In addition, brief interesting articles elaborating more fully on the points emphasized in the advertisements also filled a number of pages. This effort on the part of the Tribune was in connection with the big co-operative movement in Winnipeg which is reported elsewhere in this issue.

There is a Large Element of Psycholgy in Salesmanship

From "The Generator"

Sometimes salesmanship is too aggressive. The man behind the counter is so eager to close the sale that the customer grows suspicious and wary. Once in that frame of mind—on the defensive, so to speak—he is mighty hard to land.

Salesmanship can take a good lesson from courtship. The artful lover, it is alleged, tempers his infatuation with a little pretended indifference. He lets the young lady feel that it's a matter of small concern whether or not he is permitted to call again. He is just a wee bit bored now and then while in her company. The effect is magical. It keeps her coming his way.

There is an element of that same diplomacy in salesmanship. The moment the salesman becomes overly keen to get the customer in a buying mood, he produces a reaction that often "queers" the sale. If he can, by hook or crook, throw out the subtle suggestion that the demand for his commodity is so big and steady that the present sale cuts very little figure, the reaction will likely be favorable to the making of the "present sale."

There is a large element of psychology in salesmanship. Tact is the big thing—the good sense to know the right thing to say at the right time; or to keep as silent as the sphinx when that is the clinching argument.

The big objective is to create in the customer an honest desire to possess the thing under consideration, because it will be to his advantage; the moment he suspects that you are urging the case for your own advantage, his interest wanes—he leaves the store without purchasing, hence the danger of being too aggressive.

Some salesmen say the wrong thing, or they say too much. They fail to see how the argument is reacting on the prospect and to adjust their tactics accordingly. They are bunglers, not artists. They talk the customer into a buying attitude, and then talk on past the goal until he's out of the notion of buying. They burn up energy to no purpose; they sweat and fume without putting the sale over.

Courtesy, of course, and vigilant attentiveness are essential, but bullying, urging and brow-beating—that's another story. If there is extreme eagerness, let it seem only like an eagerness to be helpful and co-operative. Let the burning desire to land the sale be camouflaged, submerged, or somehow kept in the background.

Salesmanship can be too aggressive, particularly if the aggressiveness is manifested in a crude way. Selling is an art, in which "eternal vigilance is the price of gain." It can be cultivated, of course, but only when there is a native spark of it to begin with.

Christmas Booklet Out

The Society for Electrical Development has just mailed to the industry, both members and non-members, copies of the Christmas Campaign issue of their Monthly Sales Service. This booklet of 24 pages contains complete plans and descriptions of all the material and advertising cuts essential to those electrical business men who wish to get the most out of their Christmas selling.

The first part of the issue contains different "how-to" suggestions telling the dealer briefly and clearly how to profit the most by the campaign. The next part describes the dealer helps which are being issued by the society. The five-piece window cut-out, announcement invitations, poster stamps, suggestion booklets, lantern slides, etc., are all illustrated and described. The last part of the booklet contains about twenty suggestions for newspaper advertisements. These are all illustrated by most effective drawings. The society will supply cuts to all those wishing to make use of these ads. Anyone in the electrical industry who for any reason does not receive a copy of this issue may obtain one by writing on their business stationery to the Society for Electrical Development, 522 Fifth Avenue, New York, N. Y.

For the Christmas Trade

The Crown Electrical Mfg. Co. of Brantford, Ont., are issuing a new catalogue, No. 15, describing the Crown line of lighting fixtures and portable lamps. This is a class of material that should have a ready sale at Christmas time. One of the handsome fixtures carried by this company is illustrated herewith.

ABOUT TIME

And a drop in the price of news-print is coming from the way the shares in paper mills are being cut by the brokers who are trying to sell to investors. There are big stores of paper in many places and the number of new mills and enlarged mills will treble the output of Canada from now on. The paper mills will soon be looking for purchasers of paper as well as for purchasers for their watered stock.—Toronto World.

Western Electrical Men Hold Rousing Convention—Two Hundred Strong they Decide to Co-operate all over the Central West

About 200 electrical men gathered at the Royal Alexandra Hotel, Winnipeg, Oct 14-15, for the first electrical convention of any importance to be held in that city. Mr. J. E. Gilmour, manager of the Northern Electric Co., Winnipeg, accepted the chair. He commented upon the good turn-out of electrical men from western points, spoke of the objects of the convention and finally introduced Mr. W. L. Goodwin and Mr. M. C. Turpin.

Mr. Goodwin's remarks were prefaced by the statement that the plan he was about to outline could only be consummated by facing the problems involved in a frank and truthful manner. The conviction must be present in all hearts that honest effort alone will succeed. Trade conditions have at many times caused the reverse of this. Unfair competition and underhand methods have prevailed all over this continent. The problems are the same everywhere. Contractors, jobbers, etc., have practically the same methods of doing business and local conditions do not affect the principles of co-operative effort. The system under present consideration is not to be taken as a school idea but a method of bringing electrical men together in closer harmony so that they can work out their own problems. Familiarize them with the individual difficulties and thus develop business opportunities jointly rather than by the selfish individual method.

The object of all this is to induce the people of Canada, by all legitimate means, to use electricity for all available purposes: Light, power, household utilities, and so on. Electrical men are rendering a public service, and should be adequately rewarded. They must make a profit or go out of business.

No company or individual can provide service of any kind at cost. Even governments, surrounded by the best security, must look for a recompense. When expenditure exceeds income, bankruptcy is the common fate. Therefore the electrical man is entitled to a return on his venture. He cannot do honest work or be honest in his dealings unless he works on the basis of a profit for every job. Neither can the manufacturer, the contractor or the central station give good service unless there is a profitable return.

The plan outlined by the speaker did not, he said, impose any laws. It says, "'Do as you please. But do it with your eyes open. Keep nothing secret. Let us have the fullest publicity in the trade and between the trade and the public. Let there be the clearest light on every transaction. Let all agree upon one thing—that nothing be concealed."

Electrical men have earned a reputation for performance, but have suffered by their tendency to cut prices. Contractors have not had a commensurate reward for their work and that is an admission that they do not know their business. The credit rating of contractors is not such as to inspire confidence. Why is this? Enquiries always elicit the answer that the other fellow is to blame. Then let us educate the other fellow.

The electrical contractor should try to sell the best that [illegible] He [illegible] [illegible] etc. This is done through a purely imaginary fear of competition which in most cases scarcely exists. In New York City, it was found that there were an average of about three bidders on every job over $15,000. And there are 2,100 contractors in that city.

Jobbers should be more careful who they start in business. The public had been "stung" so frequently through inefficient work on the part of electrical men, that there was a lack of condence in the trade. In California, the co-operative campaign effort had built up a merchandissing business in 25 years from a per capita purchasing figure of $1.50 to over $45. This was the result of all branches getting together, and can be duplicated anywhere. Local men must have confidence in each other, and freely circulate the information as to prospects for business and so prevent wasted effort. Concentrate on the things that can be sold to a given household.

Standardization.

Lack of standardization in voltages came in for a share of humorous criticism, and it was pointed out that the public were in confusion as a result. Technical markings on sockets, motors and various appliances misled the people. Uniformity should be aimed at. Standardize and simplify should be the one great aim of the trade.

In organizing the trade, the audience were warned that there was much hard work ahead. They must put in hard work and money. Much must be given before anything could be taken out. Patience will be required for years, "we must put in money, energy and time, taking chances on a return after the lapse of a long interval."

The plan is an educational campaign to bring together all concerned. Retail distribution must be fostered; a permanent contact must be made between the light companies, the jobbers and the contractor-dealers. All must be organized for the exchange of ideas, keeping up with modern methods and better conduct of business.

If the electrical men knew their business, they would have been solidly organized long ago. They don't know their business. They are only elementary students. The organization is a school all must join. All must share the mutual responsibilities.

The electrical industry requires constant study and the highest development of the human brain to keep up with modern progress. It is expanding so rapidly.

We must first of all remember that the public interest must be conserved in our organization programme. We must bear in mind in all our activities that there is to be considered (1) the industry as a whole, (2) individual groups, (1) individual companies, (4) individuals.

Enormous Field for Merchandising.

In the afternoon, the delegates having submitted to the camera during the interval, Mr. M. C. Turpin took the platform and urged his hearers to put the advice they had received to good purpose. He gave figures showing the enormous field for electrical merchandising in the United States and dwelt on the parallel opportunities in Canada. There is a share for everybody.

The contractor is becoming a dealer through the evolu

Showing how closely the Electrical Men of Manitoba, Saskatchewan and Alberta can get together when they decide on a policy of co-operation. This is less than twenty-five per cent of the enthusiasts who attended the rousing banquet. Both private and municipal organizations behind the big movement

tion of the business. He is leaving the old slip-shod methods behind and following the ideas of the best retail stores.

Mr. Turpin outlined the importance of a good location for the store, well-dressed and polite clerks, neat arrangement of the stock, [illegible] window displays, then proper lighting, etc.

The field of business is enormous. Every unwired home has a potential electrical business of about $750. In the U. S., less than 50 per cent. of homes are unwired. The farmer is a prospect for about $1,500 of electrical merchandise for various purposes. The industrial field carries untold possibilities of development by electrical energy. The lighting field is perhaps the most fruitful of all. Investigations by the lamp manufacturers of Baltimore showed that of 446 plants and factories only 40 per cent. were adequately lighted.

The arguments in favor of proper lighting are many. Production will be increased, spoilt work decreased, accidents are notably diminished, discipline is improved, morale, sanitary and working conditions brought to a higher standard. Twenty-three per cent. of industrial accidents are due to poor lighting.

At this point, Mr. Turpin quoted extensively from the booklet, "Better Mercandising," covering the following subjects: Cost Accounting, Margins and Profits; Display of Goods in Windows, etc.; Seasonable Advertising, and so on.

True merchandising principles must be applied to make a success of electrical supply.

The Banquet.

In the evening, a company of about 600 attended the banquet and dance under the auspices of the Winnipeg Electrical Contractor-Dealers' Association and the allied interests of the electrical industry at the Royal Alexandra Hotel.

Mr. J. E. Gilmore, of the Northern Electric Company, presided, and the guests of honor were, in addition to W. L. Goodwin and M. C. Turpin, Premier T. C. Norris, Mayor C. F. Gray, Mayor H. M. Sutherland, St. Boniface; J. G. Glassco, manager, Municipal Hydro-Electric System; A. W. McLimont, manager, Winnipeg Electric Railway Co., J. M. Leamy, Ald. Fowler, Ald. Fisher, Dr. Daniel McIntyre, Chas. Murphy, C.P.R.; A. E. Warren, general manager, Canadian Northern National lines; Edward Parnell, Jr., D. J. Dyson, A. Johnson, W. Salmon, Prof. E. F. Featherstonhaugh, Ald. Sparling, F. A. Cambridge, Dr. J. A. Gunn and F. J. Pratt.

Following dinner, there were speeches by Mayor Gray, Premier Norris, Mr. Turpin and Mr. Goodwin. Then the company adjourned to the ball-room for the dance.

Mayor Gray spoke of the good feeling existing between the electrical contractors and the appliance salesmen of the city light and power department, and attributed this to the business attitude of the general manager, Mr. Glassco.

Premier Welcomes Delegates.

Premier Norris, in welcoming the delegates, told of what had been done in the way of electrical development in Manitoba, and said that it was the intention to let the people in the rural districts have a measure at least of those advantages that were enjoyed by the cities.

Mr. Turpin said he brought a message of fellowship from the electrical fraternity in the United States.

Urging that the development of humanity was largely measured in the terms of the development of the electrical industry, Mr. Goodwin impressed the responsibilities assumed by those who entered it. They would have to satisfy themselves they had given faithful service to the public.

During the [illegible]

programme which was contributed to by the best local talent.

The committee in charge of the arrangements was J. G. Smith. H. C. Stephenson, F. Garrett, J. H. Schumacher, L. M. Cochrane and H. Franklin.

Friday A. M. Session.

The morning session was more or less of a free-for-all discussion. The subject was, at the beginning, local problems affecting the marketing of electrical apparatus. Messrs Goodwin and Turpin outlined a general form of campaign, that with variations would be applicable to practically any large centre, and a round table discussion followed. Both speakers were bombarded with questions concerning difficulties that had been experienced due to local conditions.

It was suggested that in dealing with the examination for electrical contractors' licenses, the Province of Manitoba should also take into consideration the business qualifications of the applicant. This would go a long way towards putting the electrical contracting business in the province on a better basis.

The opinion was also expressed that it would be in the interests of all concerned if provincial and municipal authorities, in drafting any legislation where electrical matters were concerned, would have conferences with the contractor-dealers' association of the province.

There was a lengthy discussion over the fact that the province of Manitoba did its own electrical work. The consensus of opinion was that it could be done cheaper and better by contract.

Applications of Electricity

The afternoon was devoted to an extremely interesting lantern slide lecture by Mr. Turpin. Slides were shown illustrating in a most comprehensive manner the application of electricity to every conceivable requirement, from the tiny sewing machine motor to the steel-mill power plant. Each slide was briefly described by the lecturer, and the audience appreciated highly this feature of the convention.

The meeting was then thrown open for the few minutes remaining before adjournment, and an informal discussion ensued. Several of the audience spoke briefly to the effect that the convention had been a means of convincing them that the "stick together" principle was the sure road to better things.

Votes of thanks were passed to the speakers and various officials, and the proceedings came to a termination with everybody imbued with new ideas.

A Few who Attended the 'Peg Convention

Northern Electric Co.— H.B. McFarlane, C. Morgan, J. Steinhoff, R. F. Johnson, E. L. Brown, F. M. Noniss, G. Low, W. T. Hunt, F. Wilson, W. E. Lockhart, W. McKindry, J. E. Gilmour, Winnipeg; R. Millar and R. L. Brews, Calgary; W. G. Vogan, P. W. Billing, L. R. Conrad, Regina; W. H. Smedley and W. A. Carswell, Montreal.

Winnipeg City Light & Power—Messrs. Swan, sales manager; King, advertising manager; Finlay, contract department; J. G. Glassco, manager; C. A. Caton, assistant superintendent;, J. Ackman, superintendent construction; W. Evans, assistant sales manager, Winnipeg.

Canadian General Electric Co.—T. W. Brackinreid, Port Arthur; J. Murie, Saskatoon; R. N. Elgar, C. B. Whitmar, G. R. Waight, T. Pringle, Winnipeg; J. F. Millar, Regina.

Great West Electric Co., Winnipeg.—J. G. Smith, G. Thorn, H. Kitchen, J. Hunt, A. E. Stunden, F. E. Garrett, J. W. Wheatcroft, H. Elliott, P. May, Noel Cuthbert, H. F. Allen, H. C. Kennedy.

Canadian Westinghouse Co.—A. W. Lamont, E. E. Gairow, B. L. Hell, Winnipeg; George Miles, Saskatoon.

Winnipeg Electric Railway Co.—L. L. Prices, D. E Sutherland, W. Kline, W. Scott, A. W. McLimont, general manager, Winnipeg.

McDonald & Willson Lighting Co., Winnipeg, Man.—F. T. Shipman, L. B. Deikson.

Gate City Co., Ltd., Winnipeg, Man.—C. C. O'Neil, H. Munnion.

W. W. Robinson, Ltd., Winnipeg—W. W. Robinson.

Moose Mountain Co., Winnipeg—Louis Schwintz.

Levvy Electric Co., Ltd., Winnipeg, Man.—A. Levvy.

Schumacher, Gray Co., Ltd., Winnipeg—J. H. Schumacher.

Portage La Prairie Electric Co., Portage La Prairie, Man.—J. R. Walker.

Moose Jaw Glass & Electric Co., Moose Jaw, Sask.—H. C. Hall.

Norwood, Man.—J. M. Russell.

Fort William, Ont.—A. A. Mahon.

Carey Electric Co., Edmonton, Alta.—J. N. Carey.

Sun Electrical Co., Regina, Sask.—J. R. Young.

Electric Shop, Saskatoon, Sask.—D. F. Streb.

Lalley Farm Lighting Co., Ltd., Winnipeg, Man.—G. F. Ricketts.

Canadian Nathan, Ltd., Winnipeg.—D. A. McDonald.

Superior Electric Co., Winnipeg.—C. H. Fraser.

Breen Motor Co., Winnipeg.—A. E. Christian.

Winnipeg, Man.—W. E. Deinson.

Electric Motor Sales & Repairing Co., Winnipeg, Man.—W. Raymond.

Garry Mfg. Co., Ltd. Winnipeg, Man.—H. M. Farley.

Canada Wire & Cable Co., Winnipeg, Man.—A. E. Esling.

Winnipeg, Man.—A. McKinzie, B. Taylor.

Ernest Bubbs & Co., Winnipeg, Man.—Ernest E. Bubbs.

Salisbury, Mfg. Co., Winnipeg, Man.—W. W. Stroyan.

Canadian Fairbanks Morse Co., Winnipeg, Man.—M. J. Connors.

Cochrane, Stephenson & Co., Ltd., Winnipeg, Man.—H. C. Stephenson.

Sibbald Electric Co., Winnipeg, Man.—W. C. Sibbald.

Winnipeg Engineering Co., Ltd., Winnipeg, Man.—O. L. Boyd.

Power Commission (Manitoba), Winnipeg, Man.—J. M. Leamy.

Western Elevator & Motor Co., Ltd., Winnipeg, Man.—W. A. Straith.

Purity Flour, Winnipeg, Man.—G. H. Ross.

Elmwood Electric, Winnipeg, Man.—A. Saddington.

Soldoff Electric Co., Winnipeg, Man.—L. Soldoff.

Blue Bird Corporation, Ltd., Brantford, Ont.—C. N. Kane.

Benjamin Electric Mfg. Co., Winnipeg, Man.—Reg. T. Smith.

Lorne Electric Co., Regina, Sask.—J. McKay.

Fontaines A. Boulangen, St. Boniface, Man.—P. Fontaine.

Budden, Beard & Co., Ltd., Calgary, Alta.—E. W. Beard.

Will Make "Federal" Washing Machines

The Canadian Metal Products Company of Guelph, Ontario, have arranged with the Federal Electric Company of Chicago for the manufacture of their washing machines. The product will be entirely Canadian-made. They hope by October 1st to be producing at least a hundred a month.

The Important Item for the Electric Salesman to Remember —

Don't Sell Appliances—Sell Service

Tell What Electricity Will Do — Sell It Pleasantly and Graciously

Place: An Electrical Dealer's Store.

Time: The present.

Enter: Mrs. Clark, customer.

Mrs. Clark: "I wanted to tell you that that bulb you sold me yesterday for my reading lamp wouldn't work properly, and when I tried it on another socket it blew into fragments, giving me such a fright."

"Oh, I am so sorry," said the saleslady, "I hope you were not hurt in any way."

"Well, fortunately the shade protected my face, otherwise it might have been worse. Will you stand for the loss and give me another bulb?"

"Most certainly we will, Mrs. Clark. We are always ready and willing to replace defective equipment at any time. It is one of the principles upon which we do business that any fixture we sell that does not give entire satisfaction will be replaced free of charge."

"That's a cute little thing, now! What is it used for," asked Mrs. Clark, pointing to an electric fixture of white metal on a nearby showcase, representing Billiken holding a tiny little lamp above his head, over which was placed a pretty little hand-painted lamp shade reflecting a bright light on his smiling face.

"Oh, that can be used as a boudoir lamp, or for ornamental purposes," said the attendant. "We got a few samples in, and that is the last of them. We should have some more in shortly."

"Oh, yes," said Mrs. Clark, and there the matter ended.

"By-the-by, I wanted to ask you about an electric heater for mother's room. She feels the cold so; she needs more heat than the rest of us."

"That's true," answered the saleslady, "old people do require more heat. Here is a very good heater that I think would give you every satisfaction," and a popular make of electric heater was brought out for Mrs. Clark's inspection.

"How much is it?"

"Twelve dollars and a half."

"How soon could you let me have it?"

"As soon as you wish—to-night, if you like."

"Oh, if you could get it over to-night I would appreciate it; before seven, if possible,"

"Yes, I will have it delivered before seven o'clock for you, Mrs. Clark."

"Thank you so much. Good afternoon," and Mrs. Clark left the store apparently satisfied.

Now, there is nothing unusual about this conversation. It might have been heard in any electrical store. Taking it as a whole it reflects creditably on the attendant. When Mrs. Clark entered the store she was in a critical mood; the fright she had received was still in her mind. She did not stop to think about the technical reason for the accident; to her the accident was an uncommon incident, although to the dealer it was an old story. Whether the saleslady was conscious of this fact or not, we do not know; but she did the right thing: she gave the customer sympathy, and assured her that the loss would be made good without cost to her. This was all the customer could reasonably expect, and she was satisfied, and could then take notice of little Billiken sitting on the counter, smiling at her, whereas, before he had smiled in vain. When he saw the lady look at him and heard her inquire about what he could do, he seemed to prick up his ears and try to look his best. No doubt he had visions of being adopted, and at last taken to live in a nice home. The lady attendant, whose counter he adorned, spoke well of him; she gave him a very good character. From there on the business of adopting him could have been very well left to Billiken; but the saleslady made one unfortunate mistake; she called him a sample, and inferred that he was the last one she had, so that the customer got the idea he was not for sale.

There was only one feature of the conversation that might have been improved, namely, on the part of the saleslady, by substituting the words "as we get older we do," etc., instead of saying "old" when referring to the customer's mother. In this particular case it apparently made no difference, but many people might have resented it mentally, at least, if not orally. This may seem to be an insignificant matter, but it is these little things that make the difference between a real salesman and an order taker.

The Dream of Montreal Enthusiasts Realized in the Formation of a Co-operative Association Which Includes the Whole Province

[illegible] the electrical industry was represented at the convention held at Montreal, Oct. 19th and 20th. The object of the convention was the organizing of the industry under the name, The Electrical Co-operative Association of the Province of Quebec. The convention had been widely advertised, though not to the same extent as on the last occasion when Montreal men held their big organiation meetings. It was felt that the spade work had already been done, and that the definite announcement of the object of the convention would be sufficient to bring electrical men flocking from every corner of the province. A certain amount of campaign literature was distributed, however, of which the following is a fair sample:

> **It's going to be the biggest event in the electrical history of the Province of Quebec**
>
> **They've discovered that the electrical industry —meaning the Contractor-Dealer, the Manufacturer, the Jobber and the Central Stations — develops fastest when everyone co-operates on an organized plan.**
>
> **More people adopt electric service.**
> **More industries use electric power.**
> **More supplies are made and sold.**
> **More appliances are sold to the public.**
> **More wiring is done by contractors.**
>
> **Is this worth working for?**
>
> **We're going to launch the ELECTRICAL CO-OPERATIVE ASSOCIATION OF THE PROVINCE OF QUEBEC and it's going to need your help and everyone's help to put over the idea.**
>
> **Even if you are thoroughly "sold" on the idea, attend the meetings so that your presence may influence someone else. The success of the association will depend upon the individual efforts of everyone in the industry. Do your part!**

The convention opened with a luncheon on Oct. 19th in the Rose Room of the Windsor Hotel. Mr. J. S. Norris, vice-president of the Montreal Light, Heat & Power Company, occupied the chair, and briefly outlined the object [illegible] addresses were given by Mr. W. L. Goodwin, Mr. S. A. Chase and Mr. N. Simoneau, electrical contractor, Montreal, and chairman of the French section of the Electrical Contractors and Dealers' Association.

In the afternoon, there was a meeting of the various sections of the Montreal Electrical Association which consisted of the manufacturers' section, jobbers' section, and contractor-dealers' section. These meetings were for the purpose of selecting members for the different committees of the Electrical Co-operative Association which [illegible]

[illegible] Messrs. Goodwin and Chase to the contractor-dealers. It was noticeable that all the speakers of the different meetings urged co-operation between the different branches of the electrical industry.

During the morning of Wednesday, the various interests got together in an informal way and unanimously decided upon the best course to pursue, viz., to organize into a co-operative association, similar to that formed in Vancouver a few weeks ago. A constitution was also drawn up and agreed upon for presentation at the midday meeting, which was the regular weekly meeting of the Montreal Electrical Club. At this meeting, Messrs. Chase and Goodwin again spoke, and the constitution as drawn up during the morning was read out. The chairman was Mr. W. H. Winter, the president of the Montreal Electrical Club, which has given the co-operative idea its strongest support from the beginning of the movement.

Immediately following the luncheon, the inauguration meeting was held at which the electrical men present decided unanimously to form themselves into the Electrical Co-operative Association of the Province of Quebec. Mr. K. B. Thornton, general manager Montreal Public Service Corporation, presided, and the following report of the committee was adopted

COMMITTEE REPORT.

Purposes and Plans for Proposed Electrical Co-operative Association of the Province of Quebec.

The aim of this proposed association will be to promote the growth of the electrical industry of the Province of Quebec in all its branches, through the co-ordination of effort in the rendering of better electrical service to the public, based upon the conviction that more efficient electrical service as a whole to the public will elevate our industry to a plane that its merit and usefulness deserves.

The activities of the proposed association will be directed along constructive lines within the industry in the way of encouraging sound, ethical and progressive business methods that will result in a fair and reasonable profit, based upon service rendered to the public.

Its activities will also be directed along educational lines outside the industry to the end of legitimately increasing the use of electricity and electrical equipment by the general public, to the mutual interest of all branches of the electrical business.

Duties of Advisory Committee and Manager Secretary.

Your committee considers as essential to the success of this movement that a permanent advisory committee be created representing the active branches of the electrical industry in the Province of Quebec, the personnel to be drawn, on some proper basis, from central stations, contractor-dealers, jobbers, manufacturers, electrical engineers, and telephone companies. This committee should direct the activities of the association, the immediate direction, of [illegible] to be in the hands of a management committee drawn from the advisory group.

Your committee recommends that a working organiation be employed consisting of a manager-secretary and [illegible] other assistants and field representatives as may be

Prominent electrical co-operators of the Province of Quebec. On the left, around the head table are seen such typical enthusiasts as W. H. Winter, P. T. Davies, M. K. Pike, K. B. Thornton, J. Burns, J. W. Pilcher, W. P. O'Brien, S. W. Smith and R. Moncel.

[illegible] The duties of the manager-secretary will be to:

1.—Attend all meetings of the advisory committee and make proper record of its proceedings.

2.—Assist the chairman in the supervision of the work.

3.—Analyze the weekly reports and work of the field men and submit to the advisory committee a digest of same for its information and consideration.

4.—Supplement the work of the field men with follow-up letters.

5.—Prepare bulletins of an educational nature on the principles, practices and methods of successful electrical merchandising.

6.—Prepare and send to all contributors monthly reports of the progress of the association.

7.—Prepare from time to time for the electrical press and newspapers articles concerning the association's activities.

8.—Address meetings of electrical organization, architects, home builders, improvement clubs, etc., on the various phases of the electrical business and its development.

Duties of the Field Representatives.

Under the direction of the manager-secretary, the field representatives are to visit and work throughout the district with contractor-dealers, power company managers and employees, making reports at frequent intervals direct to headquarters.

In general their duties are as follows:

1.—When practical, arrange joint meetings for all electrical men in each town or city visited, for a discussion of their common interests and problems.

2.—Call upon and urge power company managers and employees to co-operate with contractors and dealers and their associations, and promote a better acquaintance between power company employees and contractor-dealers, that each may better understand the problems and functions of the other.

3.—Attend when possible local or sectional meetings of electrical contractors and dealers in their territories as often as time permits, taking an active part in these meetings and stimulating interest in the association's activities.

4.—Call upon and assist both electrical contractors and dealers, explaining good merchandising principles and practices, and point out in each case means and ways of improving the individual business, emphasizing especially:

(a) The necessity of giving service to the public, explaining the elements and practices which comprise service.

(b) The work of the association and the actual results achieved by electrical contractors and dealers who have followed recommendations.

(c) The necessity of electrical contractors and dealers co-operating with each other, explaining how each branch of the electrical contractor business depends upon the other for success.

(d) The advantages of membership in the provincial associations and the associations of electrical contractors and dealers, and of organizing sections in which local problems can be discussed at frequent meetings.

(e) The importance of co-operation and personal acquaintance with power-company managers and employees, and the necessity of giving prompt attention to the work referred to contractor-dealers by the power company.

(f) The sphere of newspaper advertising in expanding the business and in building up goodwill for both electrical contractors and dealers.

(g) The importance of correct accounting, to both the contractor, [illegible] and the dealer, promoting the use of the complete or the simplified standard accounting system, as each individual case may require.

(h) The necessity of having all owners, architects and home builders provide sufficient outlets for present and future use of electrical appliances.

(i) The value to the electrical contractor of a definite place of business and to the electrical dealer of a proper retail location.

(j) The benefits to be gained by the electrical contractors through the use of high quality material and workmanship, and standard estimating forms.

(k) The necessity of each individual electrical contractor itemizing all items of overhead expense and determining a fair average percentage for his overhead charges.

(l) The proper arrangement of electrical stores, and the correct presentation by the dealer of his merchandise to the public through floor and window displays.

Will Add Millions of Dollars to Electrical Gross Income.

It is the belief of your committee that the creation and operation along sound lines, of such an association as this, will over a period of years provide a vehicle by which it will be possible to add many millions of dollars to the gross income of the electrical interests of the Province of Quebec, in excess of that which would otherwise accrue with the unrelated efforts of the various interests.

Evidence in abundance exists of tangible results from such co-ordinated effort as here outlined. Such an organization will enable the electrical interests of the Province of Quebec to more nearly approach the saturation point in the electrical business of this province, by having co-operative machinery through which all individual and collective electrical interests can find a common point of view.

The Election of Officers

The election of officers followed. It was moved by Mr J. Burns, of the Munderloh Electrical Co., Ltd., and seconded by Mr. R. Moncel, of the Devoe Electric Switch Co., Ltd., that the following gentlemen be the officers of the Electrical Co-operative Association of the Province of Quebec: Hon. president, J. S. Norris, vice-president, Montreal Light, Heat & Power Consolidated; president, K. B. Thornton, general manager, Montreal Public Service Corporation; vice-presidents, J. B. Woodyatt, general manager, Southern Canada Power Co., Limited; J. W. Pilcher, Canadian General Electric Company, Limited; M. K. Pike, general sales manager, Northern Electric Co., Limited; F. J. Parsons, manager, McDonald & Willson, Limited; N. Simoneau, Simoneau Electric Contracting; Dr. L. A. Herdt, McGill University. Advisory committee, W. O'Brien, Montreal Light, Heat & Power Consolidated, chairman; L. C. Haskell, secretary-treasurer, Southern Canada Power Co., Limited; R. J. Beaumont, Shawinigan Water & Power Co.; N. L. Engel, Montreal Public Service Corporation; W. J. Lynch, Quebec Railway Light & Power Co.

Manufacturers' Representatives — C. Duncan, manager, Duncan Electrical Company, Limited; Geo. Wight, Monarch Electric Company; C. F. Medbury, Canadian Westinghouse Company, Limited.

Jobbers' Representatives—J. W. Pilcher, Montreal manager, Canadian General Electric Co., Limited; M. K. Pike, general sales manager, Northern Electric Company, Limited; S. W. Smith, president, Electrical Equipment Co., Limited.

Contractor-Dealers' Representatives—J. A. St. Amour, electrician, Montreal; F. J. Parsons, McDonald & Willson, Montreal; A. Doddridge, manager, Quebec Electric Company, [illegible] & Brown, Three

Rivers, Que.; W. Wiggett, Electric Repair & Contracting Co., Sherbrooke, P. Q.

Consulting Engineers—J. M. Robertson, J. M. Robertson & Company; DeGaspe Beaubien.

Bell Telepone Company Representatives—W. H. Winter, general superintendent of plant, Bell Telephone Co. of Canada

Mr. K. B. Thornton, the president-elect, spoke briefly on the work which had yet to be accomplished through the organization of this new association. "All branches of the industry," he, said "must co-operate in order that this thing be put across and put across right." Mr. Thornton stated that he wished Mr. J. S. Norris could have accepted the presidency of this new association, but owing to his arduous duties Mr. Norris would only consent to act in an honorary capacity. In closing, Mr. Thornton asked for the unindivided support of all the members.

In the evening a smoker was held, at which there were upwards of four hundred present. There was an excellent programme provided by those in charge, which included boxing bouts by seniors and juniors of some of Montreal's largest athletic clubs. During the programme, the Electrical Association presented a pair of gold cuff links to Bert Schneider, a Montreal boy, who won the amateur welterweight championship of the world in the recent Olympic games. Mr. Schneider put on a two-round exhibition bout with another of the Olympic team.

Flexible Conduits Now Made in Canada

Mr. J. Herbert Hall, managing director Conduits Co. Ltd., announces the formation of the Canadian Triangle Conduit Co., Ltd., to manufacture, in Canada, non-metallic flexible conduits, armored conductors, flexible steel conduits and flexible steel automobile tubing. The non-metallic product is described as a perfectly uniform, closely-knitted, single wall tube, non-collapsible, saturated and finished with non-absorbant flame-proof compound, and is said to have unusual qualities of wall strength and flexibility. The great flexibility is maintained by reason of the construction—a single wall of cotton yarn manufactured in a knitted loop construction. This means a series of circumferential loops in a continuous length and when bent to a small radius the loops on the outer periphery elongate, while those on the inner contract without any strain, as there are no longitudinal threads to stretch, and no horizontal threads to cut through.

The Triangle armored conductors and flexible steel conduits are produced with a single interlocking strip of cold rolled electric galvanized steel. This product also has extreme flexibility and can be bent to a radius of 1½ inch without injury. There is a marked absence of springiness in the product, which can be installed with minimum of effort.

Only the best grades of rubber-covered insulated wire are used in these armored conductors. Each length is thoroughly tested for conductivity, securely wrapped in burlap and tagged inside and out before leaving the factory.

The products of these two companies, Canadian Triangle Conduit Co. Ltd., and Conduits Ltd., will now include every type of conduit used in interior wiring, both flexible and rigid—made in Canada—and approved by the Fire Underwriters and the Hydro Commission. The manufacture of the Triangle products is being carried on in the Ellis Building at Prescott Ave and St. Clair, and shipments can be made promptly, dating from the present time. Mr. Hall will act as managing director of the Canadian Triangle Conduit Co. and will no doubt soon make the products of this company as well known as are the standard conduits, "Galvaduct" and "Loricated."

Aluminium Applications

The British Aluminium Company have issued a little booklet entitled "Aluminium Applications." It is illustrated throughout, and indicates in a most surprising way the very wide application of this metal in one form or another to practically every industry. Mr. E. T. Driver, general manager of the Canadian branch, states that a number of these booklets are available for distribution to those interested: Address 265 Adelaide St. West, Toronto.

Hubbell-Mack Machine Screw Company Getting Under Way

Mr. E. G. Mack, managing director of the Crouse-Hinds Co. of Canada, Ltd., and the Harvey Hubbell Co. of Canada, Ltd., advises us that approximately five acres at the corner of Hanson Street and Coxwell Ave., have been purchased for extensive manufacturing purposes. There is already installed on this property a Grand Trunk siding of approximately 500 feet in length, and plans and specifications are at present being prepared for a main building 500 ft. by 80 ft. either three or four storeys high, a factory 300 ft. by 60 ft. and a fire-proof pattern warehouse 100 ft. x 100 ft., two storeys high. This will be a modern daylight plant of the most approved brick and mill type construction, and completely sprinklered throughout. At the present time factory No. 1 of these organizations is located on Labatt Ave., and factory No. 2 on Carlaw Ave. When the new plant is complete there will be three companies operating in these buildings, namely, the Crouse-Hinds Co. of Canada, Ltd., the Harvey Hubbell Co. of Canana, Ltd., and a third and new company to be known as the Hubbell-Mack Machine Screw Co., Ltd.

The present plans are that construction work will be started about May 1st, 1921, so that the plant may be complete and ready for operation by November 1st of the same year. The investment in buildings alone will be in the neighborhood of half a million dollars.

Mr. E. G. Mack, who has been so successful in the management of the two companies above mentioned, will continue in that capacity and, in addition, assume the management of the new company.

"Reg" Makes His Bow to Western Canada

Captain Reginald T. Smith, who has been representing the Benjamin Electric Co. of Canada in Montreal, for the past year, has been moved to western Canadian territory, where he will have charge, with headquarters at Winnipeg. Capt. Smith has already opened an office in Winnipeg for his company and introduced himself to the western field. Eastern men say "Reg." is a mighty good fellow, and that the west is to be congratulated in getting him. The general opinion is that it will not take him long to put "Benjamin" on the western map.

Personals

Mr. E. W. Sayer, of the Sayer Electric Co., Montreal, was elected president of the Outremont Bowling Club, Outremont, P.Q., at their annual meeting on October 18th.

Mr. F. J. Allen, vice-president of the Benjamin Electric Company of Canada, has just returned from a trip to England. Mr. Allen visited the works of the English branch of his company and brings back word that they are very active at the present time.

Dr. A. B. Macallum, F.R.S., chairman of the Honorary Advisory Council for Scientific and Industrial Research since the formation of that body, and formerly professor of biochemistry in the University of Toronto, has resigned to accept the chair of bio-chemistry at McGill University, Montreal.

Twenty-Four Useful Suggestions To Be Used By The Salesman—

Say "Merry Christmas" Electrically

Let Us Make Electricity this Year A Bigger Factor Than Ever In the Holiday Trade

1. Tell your sales force all about this campaign and about your plans. Ask them for suggestions and act on the worthy ones.
2. Stimulate sales by giving extra compensation to the salesman who tops the record for Christmas sales from Dec. 13th to 24th.
3. Talk Christmas Electrical Gifts to all your friends and get your salesmen to do the same. Carry Christmas business cards and give them away liberally.
4. Have printed lists, with prices shown, of appliances suitable for Christmas gifts. Hand them out to customers—send them to prospects by mail.
5. Take the opportunity of showing the public that you are a live merchant. Lots of new customers will visit your shop—the opinion they form of your methods will decide their future relations with you.
6. Keep your store clean and smart. There's no excuse for getting slack because business is rushing—your efforts in this direction will show customers your merchandising ability.
7. Tie up with all local "Shop Early" movements—thereby making things easier for your patrons and the sales force. Christmas shopping is tiring. Arrange for the comfort of your patrons by providing plenty of rest chairs.
8. Arrange your stocks so that all the appliances most commonly asked for are not at the same counter. This distributes the crowds;. allows them to be waited on without delay and induces them to see more of the store..
9. The smaller appliances will probably be asked for more than washers, ironers, etc., but no opportunity should be lost for pushing sales of the latter.
10. Fasten "Say It Electrically" cut-outs on each side of your delivery vans. If possible also have an electrical sign on them—it is good for night advertising.
11. Make arrangements so that your depleted stocks may be replenished without causing confusion in the store or annoyance to your customers.
12. Electrical toy sales are growing and profitable. Set aside a part of your store for demonstrating them.
13. Send your circulars to all local clubs, societies, organizations and sewing circles. Make your name known to your community. Use the poster stamps on all your packages and mail.
14. Use the telephone—call up several homes each day just after breakfast time. Tell them of your special gift offers and make definite appointments to view, if possible.
15. Go after the business men in their offices. Leave short gift suggestion circulars and advise them that you will send a salesman with sample gifts, if they so desire. See pages 14 and 15.
16. Tell your customers through your newspaper advertisements that telephoned orders will receive prompt attention. Advise them about payment—C.O.D. or otherwise.
17. Wrap up your packages in some distinctive paper that carries out the spirit of the Season.
    Arrange to mail packages for your customers packing in special holiday boxes.
18. Customers will appreciate a policy of exchanging duplicate gifts for others of equal value. Tell them you do it.
19. Have all your sales force wear a sprig of holly in their buttonholes. Make your store radiate the Christmas spirit in its general arrangement and in the attitude of the sales force.
20. Give away an inexpensive toy to children, whose parents make purchases of $10.00 or over. Advertise your intentions in the newspapers.
21. Have a sample table of Christmas electrical gifts near the entrance. A sign such as "A glance will help your choice," will prove of assistance in making selections.
22. Customers appreciate thoughtfulness. Have a desk with pens, ink and blotting paper, where patrons can fill out Christmas cards.
23. Get two extra "Say It Electrically" cut-outs, paste them on sandwich boards with your name and address in bold type. Have a sandwich man parade through the streets and places where the crowds congregate.
24. There's plenty of business for all. Co-operate with the other branches of the electrical industry—the advantages will be mutual.

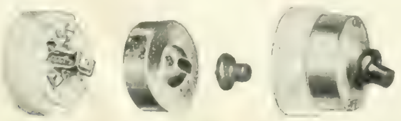
What is Newest in Electrical Products and Devices

The washer shown here is that manufactured by J. H. Connor & Son, Ltd., Ottawa, Ont., and among the characteristics claimed for this washer by the makers are the following: stave legs built into tub, not bolted on, assuring absolutely rigid construction; tub made of extra heavy selected cypress, built to last a life time; four full swivel castors with wide tread which will not mark any floor; best quality rubber rolls, 12 inch wide, giving generous wringing surface; swinging wringer which will lock in any position, equipped with large reversible water board; all gearings covered, and endless "V" belt underneath the tub and out of the way. The machines are supplied with the following motors: 25 cycle, 110 volt a. c.; 30 cycle, 110 volt a. c.; 60 cycle, 110 volt a, c.; 32 volt d. c.; 110 volt d. c.

The Connor company are launching out on an extensive advertising campaign, in which they point out that the reasonable price at which this machine sells gives the public the most value for their money and assures good profits for the dealer. Shipments are made from Ottawa, Ont., London, Ont., and Winnipeg, Man. The company are represented in British Columbia by the McPherson & Teetzel Company, Vancouver, B. C.

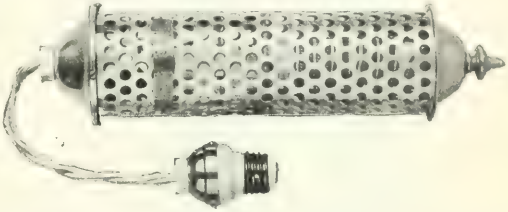
Bryant Toggle Switch

A convenient switch for washing machines, mangles, etc., is the toggle-switch here shown, which is manufactured by the Bryant Electric Company, of Bridgeport, Conn. The base is of porcelain in which the mechanism is fastened by means of screws from the under side of the porcelain, and sealed in accordance with Underwriters specifications, to prevent loosening. The actuating spring is of specially tempered steel music wire which provides a quick make and break contact in operation. The covers are brass, polished nickle and with sheet fibre insulation lining the entire inner surface. The indication feature is supplied on the outside of these covers.



Pendent Luminous Heater for Household Use

A 660-watt pendent luminous heater for household use is being placed on the market by the Adon Products, Inc., 516 Fifth Ave., New York. The heater, which is tubular in shape, is attachable to any electric light circuit for 120 volts, alternating or direct current. All outside parts are nickel-plated, with a perforated metal shell to protect the heating elements, and with devices for securing baffles and deflecting disks. All contact parts are insulated with heavy mica, and the heating coil resistance wire is wound on an insulated tube secured to the outside shell by ½-inch supporting nickel-plated straps. Designed especially for chilly rooms, the device can be used by tourists, travelling salesmen in cold hotel rooms, summer houses, ticket and cashier booths, and many other places where a larger unit would not be easily available.



Shadow Shield for Electric Light

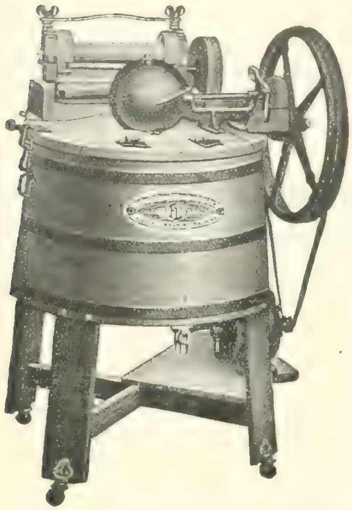
A shadow shield has just been marketed by the Western Electric Co., 195 Broadway, New York, for use with the type "C" gas-filled lamp. The shield is of white translucent glass and fits the bowl of the lamp snugly, reflecting the light downward. Any light that passes upward is thoroughly diffused, casting no disagreeable shadows upon the ceiling, hence the name given to the device. This shadow shield was developed principally for use in inverted glass bowl lighting units to eliminate the reflections and shadows peculiar to that type of lighting. The shields are supplied for 100, 150 and 200 watt lamps.

Gillespie Eden in New Toronto Quarters

The Gillespie Eden Corporation, formerly of 23 Scott St., announce that they have moved into more commodious quarters at 266 King St., West, Room 202. Mr. Forbes Grassick is manager for the Canadian district.

A "Snow-White" Washer

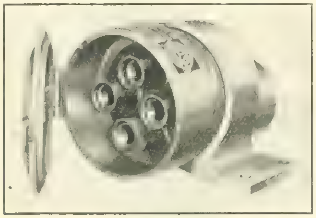
[illegible] West Montreal. [illegible]



[illegible] its literature, "all we have to do is to put in the water and the clothes, close the lid, and turn on the current; in a little while you will have snow-white clothes." This machine is solidly built and simple in construction.

Four-Pole Receptacle

A four pole receptacle has been developed by the Delta Star Electric Company, Chicago, for two-phase service and for a three-phase motor service, where it is found necessary or desirable to ground the motor frame. It is a development of the company's three-pole type. It is used in series with [illegible] for opening or closing circuits under load.



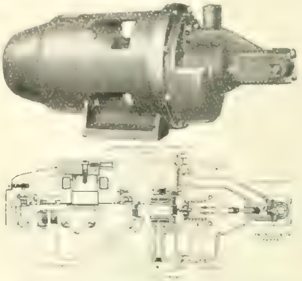
Motor-Driven Machine Ties Parcels and Boxes

One of the latest applications of small motors is the tieing of bundles. A machine has been invented, driven by a half horsepower motor that automatically ties and releases each bundle or box placed on its table. The machine is also [illegible]

M[illegible] Canada Gazette of the incorporation of the British Radio Corporation of America, Ltd., with head office in Montreal, Que., [illegible] wireless telegraph and telephone apparatus and accessories. The company is capitalized [illegible]000.

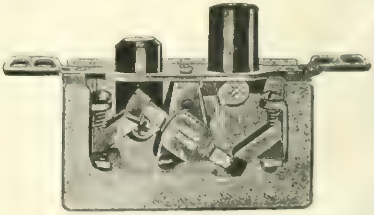
A Small Utility Turbo-Generator

Although developed especially for supplying energy for locomotive headlights, the turbine-generator units just placed upon the market by the Westinghouse Electric & Manufacturing Company may be used for lighting service in small isolated steam plants such as pumping stations, small steam shovels, oil well derricks and in other applications where a small amount of lighting is required. The construction is especially advantageous for portable application, as it is designed for severe outdoor service. This unit is small, light and compact, requiring no foundations. It can be set up on a floor, heavy board or in any horizontal place and held in position with four small bolts, studs or lag screws. While totally enclosed, all parts are readily accessible by removing the end cover on the generator and the turbine end casing on the steam end. There are only five moving parts—the shaft carrying the generator armature and the turbine rotor—two governor weights—governor spindle and governor steam valve stem, thus making for simplicity of operation.



"New England" Switch

Frank T. Groome, 1710 Royal Bank Building, Toronto, who holds the Canadian agency for John I. Paulding, New Bedford, Mass., manufacturers of switches, fuseless rosettes, porcelain sockets, etc., is very enthusiastic about his New England Switch. Before placing this switch on the market, it was operated 124,000 times without showing any perceptible wear. It is claimed to be very simple in operation and strongly made.



In our last issue we mentioned the address of the Baetz Bros. as Brantford. This, of course, was an error. It should have read Kitchener, Ont.

This year's Canadian grain crop, according to the latest announcement of Ottawa's Statistical Department, is the biggest on record by some thirteen million bushels.

CADMIUM-COPPER WIRE

—— THE WIRE FOR WEAR ——

During the War the whole of our output of Cadmium-Copper Wire was taken by the European Governments for War purposes.

We are now once more in a position to supply the requirements of our customers for this well-known wire in all sizes for Trolley Wire, Transmission Lines, Telegraph Wire, &c.

CONDUCTIVITY	7% TO 10% LESS	THAN HARD DRAWN COPPER
TENSILE STRENGTH	**10% TO 75% GREATER**	

According to size of wire.

As an Asset Cadmium-Copper has the same Scrap Value as Electrolytic Copper.

TROLLEY WIRE

is manufactured by us in

ROUND,
GROOVED,
NON-FOULING,
SPECIAL SECTIONS

and has been supplied by us to the principal Street Railway Systems of the Dominion. The following Report was received by us from the Superintendent of one of the largest systems:—

> "On May 8th, 1919, we strung the outside curve with a sample of this wire. The opposite curve in the same direction had been strung with ordinary trolley wire a very short time previous.
>
> "On December 21st both curves were measured with a micrometer. This would give each curve 228 days' service, and taking 365 mils as the diameter of a 2/0 wire, we found that the maximum wear at any point on the cadmium wire was 20 mils, while the maximum wear at any one point on the ordinary copper wire was 60 mils. The average wear on the cadmium wire was 5 mils, and on the copper wire about 20 mils.
>
> "At the above rate of wear the cadmium curve should last **between two and three times longer** than the other curve."

SERVICE COUNTS

Eugene F. Phillips Electrical Works, Limited

ESTABLISHED 1889

Head Office and Factories - MONTREAL

Current News and Notes

Chatham, Ont.

Arrangements have been made between the Chatham Public Utilities Commission and the Chatham Gas Company whereby the latter's gas engines and electrical generators will be available as an auxiliary unit in case of emergency. This will give the city at least five hundred horsepower, which, it is hoped, will take care of any reduction ordered by the Ontario Hydro Commission.

Kitchener, Ont.

Contract will be let for electrical work on $150,000 theatre being built at Kitchener by the Independent Theatres of Ontario, Ltd. Architects, Hall & Duerr, 209 Lumsden Bldg., Toronto, Ont.

Lennoxville, Que.

The Wiggett Electric Co., 71 Wellington Street, Sherbrooke, Que., have been awarded the contract for electrical work on $25,000 branch of the Royal Bank of Canada being erected at Lennoxville.

Lethbridge, Alta.

Messrs. W. L. MacKenzie & Co., Third Avenue, Lethbridge, has been awarded the contract for electrical work on $75,000 branch for the Standard Bank of Canada being built at Lethbridge, Alta.

Montreal, Que.

Messrs. J. C. Brunet & Co., 223 St. Lawrence Blvd., Montreal, have been awarded the contract for electrical work on $60,000 repairs to warehouse owned by L. Chaput & Fils Co., Montreal.

Montreal East, Que.

Messrs. P. Lahee & Company, 3 St. Nicholas St., Montreal, have been awarded the contract for electrical work on $24,000 addition to Protestant school being built by the Protestant School Commission.

Ottawa, Ont.

Mr. W. H. Chambers, Rosemere Ave., Ottawa, has been awarded the contract for electrical work on $100,000 addition to Library Bureau Bldg., Ottawa.

Mr. E. Headly, 645 Echo Drive, Ottawa, has been awarded the contract for electrical wiring, and Mr. H. L. Allan, 272 Bank Street, Ottawa, the contract for electrical fixtures on $5,000 residence being built on Brighton Ave., by Messrs. Fryer & Pout.

Peterboro, Ont.

Messrs. Miller, Powell & Watson, 438 George Street, Peterboro, have been awarded the contract for electrical work on $50,000 addition to the Canadian Woollens Ltd, Peterboro.

Port Arthur, Ont.

The main Hydro-electric terminal station for this district is now under construction in the north end of Port Arthur, near the city pumping station. The building is to be sixty-five feet by forty and thirty-five feet high. It will be of frame with a concrete shell, and will contain the transformers to step down the Nipigon power from 110,000 volts to 22,000. Power will be delivered to the city sub-station on High Street, where it will again be stepped down to 2,200 550, 220 and 110 volts. The building will be completed in about two months.

Quebec, Que.

Contract will be let for electrical work on $50,000 addition to Catholic home being built by St. Patrick's Parish. Architect, F. G. Robb, 127 Stanley Street, Montreal.

Sherbrooke, Que.

The Wiggett Electric Co., 71 Wellington Street, Sherbrooke, have been awarded the contract for electrical work on $25,000 diet kitchen for the Sherbrooke Protestant Hospital.

St. Martine, Que.

The Amiot Electric Co., Valleyfield, Que., has been awarded the contract for electrical work on $25,000 extension to Catholic convent being built at St. Martine.

Three Rivers, Que.

Mr. J. B. Badeaux, 471 St. Maurice St., Three Rivers, Que., has been awarded the contract for electrical work on $30,000 bank being built by La Banque D'Hochelaga, Three Rivers.

Toronto, Ont.

The Mechanical Trades Co., 54 University Ave., Toronto, has been awarded the contract for electrical work on the John Fisher School at a cost of $850.00.

Messrs. Patterson Electric Co., 43 Fermanagh Ave., Toronto, have been awarded the contract for electrical work by the Board of Education, on the Givens Street School, at a cost of $650.00.

Vancouver, B. C.

Contract will be let for electrical work on warehouse and wharf to be built at 1527 Main Street, Vancouver, by the Franco-Canadian Trust Co., Rogers Bldg., Vancouver.

COPPER BUS BAR

STOCK SIZES

1/16 x [illegible]"
1/16 x [illegible]
1/8 x ½
1/8 x ¾
1/8 x 1
1/8 x 1½"
1/8 x 2
1/8 x 4
3/16 x ¾
3/16 x 1
[illegible] x 4
3/16 x 1½"
3/16 x 2
¼ x ½
¼ x ¾
¼ x 1
¼ x 5
¼ x 1¼"
¼ x 1½
¼ x 2
¼ x 2½
¼ x 3

We carry in stock a large assortment of COPPER & BRASS SHEETS, TUBES & RODS

Write us your requirements

The Booth-Coulter Copper and Brass Co., Limited

"The Copper and Brass People"

115-121 SUMACH ST. TORONTO

ALLEN NON ACID SODERING FLUX

Common Horse Sense

Have you ever thought how foolish it would be for a man to advertise an article which was not what he claimed for it?

We have been telling the truth about

Allen Sodering Flux

for 28 years. It is the best flux made. Try a sample just to prove it. It works on all metals.

Stick, Paste, Liquid or Salts.

Try a Sample at our Expense

L. B. Allen Company, Inc.
4550 N. Lincoln St. Chicago, Ill.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MacLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 296 Broadway
CHICAGO - - Room 803, 63 E. Adams St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Vol. 29 Toronto, November 15, 1920 No. 22

Starving Out Public Utilities Reacts on All Other Industries

The popular sport of the day is starving out public utility companies and one cannot help wondering whether the general public realizes the extent to which the past prosperity of the country has been built up upon the aggressive tactics of these companies, and how intimately our immediate future development is dependent upon our utilities being kept in a healthy state. If there is any doubt in the mind of any citizen as to the value of his public utility company, let him sit back and ask himself where his community would have been to-day without it? Who else would have taken the necessary risks? To what extent have I, as a citizen, benefitted by its success?

This latter question is one that few citizens are honest enough to answer. Led on by interested politicians the cry always is—look what the other fellow got out of it! They forget the risky expenditure of time and money on the part of the company; they forget the benefits that have accrued all along the line to their town or city as a whole and to themselves individually; they see only that, on the surface, the other fellow seems to have made a little surplus over and above expenses and, not being of a thrifty nature himself, but being a spend-as-you-go sort of individual, the average citizen gets up and howls with the crowd that the public utilities must be starved to death in order to save expenses.

But does the average citizen really see where this all leads? Does he count the cost to the municipality, of an inadequate transportation system, for instance? Does he realize the physical degeneration which must follow and its effect upon industrial production? Does he foresee its ultimate effect on the moral and physical condition of the individual citizen? Does he realize that a starved transportation system dwarfs the ideals, narrows the vision and throttles the natural aspirations of those who would, if given a chance, make progress?

So with other utilities. They are a part of the body politic, and you cannot starve one part of the body without interfering with the efficiency of the whole.

Elsewhere in this issue we print the well considered opinion of the Board of Governors of the Investment Bankers Association of America on the necessity of keeping the public utilities in such a healthy condition that the necessary funds may be made available for extensions and replacements as required, and just as we go to press an interesting letter comes in from Vancouver on the same subject. This letter is written by the B. C. E. R. Co., and addressed "To the Business Men of British Columbia." It is a presentation of facts as they affect the citizens of the coast province more particularly, but is equally applicable to other provinces and we reproduce it below:

To the Business Men of British Columbia:

One six-billion-dollar industry with a purchasing power of between $600,000,000 and $700,000,000 a year is virtually out of the buying market.

Another five-billion-dollar industry which ought to spend $750,000,000 a year has its purchasing power greatly curtailed.

Business is losing these orders.

The industries are the electric railways and the electric light and power systems of this continent. Their credit largely gone, unable to raise new capital, these public utilities have stopped growing. They are out of the market for anything but essential maintenance supplies. Except in a few cases where fair rates and fair treatment have been accorded them, expansion has ceased and business generally has been deprived of a customer.

The electrical utilities would again be in the market for supplies for new power plant equipment, wire, rails, ties and other materials, but they cannot attract capital because they have been unable to make a fair return on capital previously invested. Public distrust and antagonism have made public securities too risky for investment today, especially when government and other gilt-edged securities are offering 8 per cent. interest.

With their purchasing powers restored, public utilities would place more orders for supplies. The expansion of their facilities would mean expansion of other industries dependent upon electric power and transportation. More people would be employed directly or indirectly in Vancouver and their purchasing power would have its effect upon your receipts.

To show how the cost of electric power development is divided, here is a segregation made by a big electric company:

PRODUCTION

Dams, penstocks, etc.	27 %
Power plant buildings, etc.	4.67%
Hydro power plant equipment	4.8 %
Furnaces, boilers, etc.	2.5 %
Steam power plant equipment	3.5 %
Miscellaneous equipment	.1 %
	42.57%

TRANSMISSION

Substation equipment	[illegible]
Substation buildings	[illegible]
Overhead system	7.5 %
Poles and fixtures	[illegible]
Miscelleaneous equipment	.001%
	16.181%

DISTRIBUTION

Poles and fixtures	10 %
Overhead system	11.6 %
Substation buildings and structures	.5 %
Substation equipment	3.5 %
Miscellaneous equipment	.05 %

[illegible]	7.5 %
[illegible]	1.6 %
Meters	1.3 %
Municipal buildings	.6 %
Construction camps and equipment	.049%
Telephone lines and equipment	1.35 %
[illegible]	.2 %
	41.249%

These items might be divided up again, showing how much of each substation cost went for labor, how much for concrete, lumber, etc. In the construction camps there would be large items for food, others for tools and machinery, houses for workmen and innumerable other items reaching every class of trade.

Similar segregations could be made of the cost of electric railway construction, a large part of which is labor, which, in turn, brings orders to the grocer, the butcher, the hardware man and every other merchant.

Any capital expenditures for such purposes are out of the question today because capital will not invest in public utilities until there is a new attitude on the part of the public.

The only orders given by public utilities, therefore, are those necessary to keep the industry going. Expansion requiring new capital is in evidence only in those parts of the country where commissions, legislatures and such authorities have so realized the dependence of the community upon the credit of public utilities that they have granted liberal protection to their investment and assurance of fair returns.

Purchases made by the British Columbia Electric Railway Company for current supplies at present amount to approximately $1,250,000 a year. One California company is starting upon a programme of development which requires an expenditure for new construction of a million dollars a month for fifteen years, provided funds can be obtained. Construction work by our company would mean millions of dollars in increased business to local firms.

The annual payroll of this company exceeds $4,000,000 a year. The major portion is spent immediately upon the every-day requirements of life. Every merchant directly or indirectly obtains some of this $4,000,000. Similarly a large part of any construction work would mean wages which would be added to this total.

Do you realize how your interests are affected by the financial condition of your public utilities and how your business will suffer by the inability of your public utilities to attract new capital? Other businesses, realizing that the public utilities' interests are their interests, are actively taking up the case of the street railway and lighting company against public antagonism.

It is good business for them. Why not for you?

British Columbia Electric Railway Company, Ltd.

Where are the Blessings That Were to Follow the War?

It has been said that the war would be followed by many blessings which, in a measure at least, would offset the tremendous sacrifices we, as a nation, and a large number as individuals, were called upon to make. The world in general, and Canada in particular, was going to be a better place to live in: a place where unity of interests would make the whole nation "kin". Lines of demarkation between religions, parties and classes should become obliterated, for "None would be for party, and all would be for state."

How is it coming along?

The conditions surrounding religions and politics is too complicated at the moment to encourage an expression of opinion beyond the fact perhaps that while the lines of demarkation are by no means obliterated there is evidence that these lines have been dislocated—whether permanently relocated it is impossible to say. It is extremely doubtful, however, if the feeling among either religious or political parties is any more cordial than in the old days. As we said above, however, certain of the boundary lines have been shifted and it may be that in the process of rearrangement they may be lost sight of altogether. Let us hope so!

[illegible] to speak of the noticeable lack of harmony among the various "classes" that compose our citizenship, the lack of forbearance, the disinclination to look at our problems from both sides, the bitter struggle to establish the old adage that "might is right" which was never intended to be used in any but an ironical sense—and yet, some way or other, has always seemed to get a strangle hold on whatever class may, for the time being, possess the power to exercise its might.

In the province of Ontario for example there is what is called a farmers' government. It is quite true that the rural community of this province represents about one-half of the total population, but that does not alter in any way the fact that Ontario has "class" government, just as truly as if the party in power consisted entirely of lawyers or doctors or engineers or manufacturers or any other of many classes that might be mentioned. The argument at the moment is not so much whether this "class" has acted fairly or the reverse as that by this definite segregation they have become targets for criticism. Leaders and speakers who were formerly unaware of the existence of farmers as a class, now sharpen their quills and their wits at their rural brothers' expense. This has led to much ill feeling and vituperation on both sides. For example, no more nasty, unnecessary, and for that matter no more untruthful, article was ever written than that which appeared not long ago in an eastern paper, the Halifax Herald. It was a compilation, for ages back, of all the unfavorable things that have ever been said and thought about the farmer "class," evidently written by one who had no first hand knowledge, but whose disposition was naturally sour, a condition plainly accentuated by some abnormal, though we hope temporary, disarrangement of that organ upon which depends to so great an extent the answer to the question "Is life worth living?"

Another article which perhaps had less of bitterness, though each sentence, insofar as the writer was able, was charged with insult, has appeared in a paper which we regret to say is published in the capital city of Ontario—Saturday Night. This article was written, we have been told, by a man who labored under the impression that he is a humorist, though how it would be possible for the gentle art of humor to take refuge within the same disorganized abode with the insulting, common, sentiments expressed in this article, it is difficult to understand.

The point is here, however. The editor of the Farmer's Sun has taken the matter up (it is a thousand pities both articles were not treated with the silent contempt they deserve) printed both articles in his paper, holding them up like red rags to inflame the passions of his readers, and calls upon the farmers to avenge the insults thus heaped upon them by these two irresponsible idiots who, in the minds of the farmers, represent the sentiments of town and city dwellers in general.

Thus we strengthen the wall that separates class from class. Does the farmer make reprisals? Surely! Right in the province of Ontario to-day the reprisals are taking the form of a drive on capitalists. The down-trodden farmer has long enough endured the yoke placed upon him in the way of taxes and other equally objectionable things—by the capitalists, as he claims to believe. A big central station organization happens to cross the path of the government just as its members are writhing under the insulting language of the aforesaid man of humor. "Here," they say, "we'll show you fellows who's in power now. We want some more electric power. Generate it for us. Hand it over quick. We'll give you the price you were getting when we sold our wheat for 90 cents a bushel (though it is nearly three times that figure now) and, if you don't, why then, you enemy of the state, you Shylock, (though twenty years ago the country begged you to risk your all; 'thou diest, and all thy goods are confiscate.'"

And so it goes. Where will it end, we ask? God only knows. Do we really not look in vain for a sign of that spirit of put-yourself-in-his-placeiveness that the ending of the war was to bring in. We shall get it some day we hope. Some day when super idiots cease writing for the press mere jumbles of words so far as facts are concerned, and whose only effect is to inflame and alienate, and some day when one "class" shall cease this endeavor to impose its will upon another.

Vancouver to Have Its First Electrical Show

Vancouver will have its first electrical show during the week of Nov. 22nd to Nov. 27th inclusive. It will be held under the auspices of the newly-formed British Columbia Electrical Co-operative Association.

Committees have already been appointed to carry out the details of the show, which, it is expected, will feature all the latest ideas in the electrical field from massive electrical equipment to the smallest household device. Already most of the space in the building has been spoken for by local electrical firms. Many spectacular and entertaining features are proposed.

The general committee will be headed by Mr. E. E. Walker of the B. C. Electric Railway Company as manager, with Mr. J. F. Little, district manager Northern Electric Company, as assistant manager. The chairmen of the various committees forming the main committee are: Finance, H. Pim; light and power supply, J. Muirhead; interior and exterior illumination, W. W. Fraser; design, decoration and display, T. Brettell; entertainment, E. H. Hughes; location and space division, W. C. Mainwaring.

As this is Vancouver's first electrical show, it is attracting much attention and is being looked forward to with great expectations which, if the personnel of the committee is any indication, will be fulfilled.

Maritime Power Developments

The New Brunswick Electric Power Commission, which was appointed during the early summer, has lost no time in having investigations made on some of the more promising power possibilities of that province. Already reports have been presented on the Shogomoc and Musquash rivers, the former a tributary of the St. John, and the latter emptying into the Bay of Fundy. It has been decided to proceed with the development of the Musquash immediately and tenders have been called to November 24th for turbines and generators. The generators will be three in number with capacity of 2700 kv.a., each, 300 r.p.m. 60 cycle, driven by 3200 h.p. turbines. This plant will be situated within easy distance of St. John.

The chief engineer of the New Brunswick Electric Power Commission is Mr. C. O. Foss, who is also chief engineer of the St. John and Quebec Railway. Mr. Henry Holgate is consulting engineer, and the Toronto firm of C. H. & P. H. Mitchell, engineers to the commission, will have charge of the design and erection of the plant.

It is quite noticeable that the Maritime provinces are now actively engaged in developing their hydro-electric potentialities. Another plant which is well on to completion is that of St. Margaret's Bay in Nova Scotia, some 15 miles west of the city of Halifax, the principal city of that province. C. H. & P. H. Mitchell are also engineers on this work.

Daylight After Dark

Nela Park, Cleveland,
Nov. 4, 1920.

The Editor, Electrical News:

I have noted with interest a discussion entitled "Daylight After Dark" in the October 15th number of your journal. This discussion largely pertains to the Sheringham daylight reflectors. It appears to me rather inexcusable that this article should make no mention of the real progress which artificial daylight units developed by me years ago have made in this country. This is a criticism I would apply in general to notices which I have seen pertaining to this Sheringham unit.

I do not wish to discuss the merits of this particular unit more than to state that I tried this method out about eight years ago and abandoned it in favor of the straight-forward method of modifying the light by selective transmission. Inasmuch as I have published descriptions of my own work and developments and also those of others in various places, it appears rather strange that these have not come to your notice. I submit a few references to some of my own publications, as follows:

Color and its Applications, 1915, D. Van Nostrand Co. Chap. XI.

The Lighting Art, 1917, McGraw-Hill Book Co., Chap. X and XI.

Artificial Light—Its Influence Upon Civilization, 1920, The Century Company, Chap. XXI.

Artificial Daylight—Its Production and Use, Trans. I.E.S., Vol. 9, p. 839, Nov. 8, 1914.

A Practical Realization of Artificial Daylight, Elec. World, Sept. 19, 1914, Vol. 64, p. 570.

Artificial Daylight in Practice, Elec. Wld., Vol. 66, p. 71, 1915.

For six or seven years we have had on the market our so-called artificial North Skylight color-matching unit, our Noon Sunlight unit and our Mazda C-2 (daylight) lamp which is a compromise between artificial daylight and luminous efficiency, and is merely a large step toward noon sunlight. We have many thousands of the first two units installed throughout the country, and since we placed these on the market, The Artificial Daylighting Company has brought out color-matching units and I understand has sold a great many of them. Our Mazda C-2 (daylight) lamp which meets the requirements in a great many cases gives a light approximating average daylight in quality and is of sufficient luminous intensity to be used for general lighting purposes. These have already been sold to such an extent that millions of them have been manufactured and installed.

In some of the references given above you may be interested in reading of the historical developments of artificial daylight and of the industrial and commercial applications which we have found for them.

Yours very truly,
M. Luckiesh,
Director of Applied Science

It may that the heading on our article viz., "Daylight After Dark" was a little too general, but the subhead surely makes the object of our article abundantly clear. It is a description pure and simple of the Sheringham reflector, and was not intended to be camouflaged in any way. We willingly print M. Luckiesh's comments.—Editor.

The Robbins & Myers Company, Springfield, Ohio, have issued a very attractive catalogue illustrating and describing the various types of alternating and direct current, oscillating and non-oscillating, ceiling and ventilating fans manufactured by the company.

Electric Club of Toronto Heard of Work of the Society for Electrical Development

At their regular weekly luncheon on Friday, Oct. 29, the Electric Club of Toronto were fortunate in having as their guest and speaker Mr. Frank W. Wakeman, general manager of the Society for Electrical Development. Mr. Frank Kennedy, who occupied the chair, in introducing the speaker, declared that the club was honored in having as their guest one who occupied so high a place in the sphere of electrical matters. Mr. Wakeman, he said, has been vice-president and general manager of the McGraw-Hill Publishing Co., president of the American Trade Press Association, and was also an ex-president of the New York Electrical League.

Mr. Wakeman told a brief story of how the Society for Electrical Development had been initiated and developed. It had been a hard, up-hill task for the founder, as he travelled over the country trying to interest the men of the electrical industry in this idea of a society which would work for the interests of all branches of the trade. He was told that if a central station man were placed at the head of the organization, the electrical contractors would have nothing to do with it, and, vice-versa, if an electrical contractor were at the head, the central station men would fight shy, while if a jobber were elected president. both of the others would have nothing to do with the association. Today, however, with the society thoroughly established, with all the branches of the industry represented, the central stations, from the largest to the smallest, all the big jobbers, and some six hundred electrical contractor-dealers, each branch having their representatives on the board of directors and the executive committee, there had never been any friction whatsoever. Plans that had been considered Utopian had worked out in a common-sense way.

"The days when the founder of our society was travelling about in an endeavor to work out his idea were the days when people were calling each other hard names," said the speaker, "and the National Electric Light Association and the other electrical organizations held their sessions behind closed doors. Today, however, throughout the United States, generally speaking, you find the men in the electrical industry calling each other by their first names, and nearly all the associations now open their doors to outsiders and members of other organizations are invited to address them. So that if you go to an N. E. L. A. convention you will find a jobber on the programme; or at a jobbers' convention, you may hear from a central station man or a contractor. The old idea of every man sitting in a corner and playing his own game is gone by. Both here and in the United States it is realized that we can accomplish more by co-operation than we can ever do by keeping to ourselves.

"It is seven years now since the Society for Electrical Development commenced work, and among other schemes it has undertaken are the "Electrical Weeks" when great advertising campaigns have been organized throughout the entire country to call attention to the advantages of electrical service. These have been a great success.. Rotary clubs, chambers of commerce and other associations have joined in the campaigns, governors of states and mayors of cities have lent their assistance, and newspapers have given them the widest publicity, not only through paid advertisements, but also by prominence in their editorial pages. During "Electrical Prosperity" week, the newspapers gave over a million dollars' worth of space to electrical matters, and during America's Electrical Week, one and a quarter million dollars' worth of space was devoted to the electrical industry. I don't think any other industry ever got such widespread publicity.

"Another advantage ,aside from the publicity, was that the committee who handled "the weeks" locally, made up of men of all branches of the industry, got acquainted with each other and worked together in a spirit of friendship and harmony. That, I believe, was one of the most valuable results of these electrical weeks.

"Then three years ago W. L. Goodwin and S. A. Chace started out to organize the electrical industry and have done a great work. They have spoken in every community in the States from 10,000 population up. and have left their mark. Now the Conference Club has been formed, to which all branches of the trade belong, and the object of which is to discuss labor problems and matters of general interest. This is the happy omen for co-operation within the ranks of the industry. In Canada the work you have started in Toronto is spreading, and in Winnipeg, Vancouver and Montreal, they are getting together. The Society for Electrical Development is working in with those organizations and offering what assistance it can. An important feature of this development is the ever-widening circle reaching out into the suburbs and into the smaller communities. There is no reason why there should not be local organizations all along the line and why the whole feeling should not be one of harmony.

"The Society has spread to England, Australia, New Zealand, Switzerland and Japan. Electrical pages are run in English and Scottish newspapers, similar to what you have in your Toronto Globe each week. We get electrical pages sent in to us from all over the country. Sometimes we get as many as 100 or 120 in a week. This shows how the thing is developing. Recently we had members join the society from Halifax and from Vancouver. The daily newspaper is the big medium through which you can reach the public, and I don't think there is any comparison between the value of small ads scattered through the paper. and the page on which they are all gathered together.

"Just to show the value of this publicity I may mention an incident that occurred recently. We put out a short story on electrical refrigerators, and the arrangement with the editor to whom it was sent was that he should send any enquiries in to us, rather than depend upon his own judgment, and that we would let him have a reply which he could put on his own letter-head. Now we had some 700 letters come in to us following that story. You can't always trace the results of publicity, but here is one striking instance of the influence it has. It shows two things: the effect upon the public, and the market there is waiting for development.

"Last year I talked with you about the exhibition, and I understand that you had an electrical building this year. Personally I would like to see the electrical features predominate over everything else in the minds of the public. We have done a great work in popularizing the slogan, 'Do it electrically.' We had 12,000 replies in our competition for the best slogan, and chose this one because it was short. pithy and to the point. It has been firmly fixed in the minds of the public through every possible medium, and 'Do it electrically' is now more familiar in the States than any other slogan. We don't restrict its use to the members of the association. Put it on your letter-heads, your envelopes, your bill-heads; display it in your office or store, and bring it before the public in every possible way. The quickest way to commercial success is through the education of the public. We can't get there by merely talking among ourselves. Nowadays you can attain no success worth while unless the public understands the problems of the industry. The industry must be popularized.

"The Society has established a weekly service to newspapers and magazines, containing news items. No attempt has been made to advertise. We simply try to get the information to the public of the United States. We endeavor to make the story of human interest, and in sending out our electrical matters, while they are intended to point out the importance of electrical service and to enlist the sympathy of the public with electrical utilities, they are never written as propaganda. There is always something of real interest in the story.

"We have done a great deal of work in addressing boards of trade, industrial organizations, Rotarian clubs, etc., all over the country and in every case help on the electrical idea. We have compiled a list of over 3,000 uses of electricity, which enables us to give a valuable service. For instance, a woollen mill comes into a town and the power salesman wants to get them on the service; a member writes in and we can give him full particulars as to equipment and service for this type of plant, as we have the information on file for every industry there is. If you will cast your minds back six years ago when a salesman stood with one foot in the door trying to sell a toaster or some other small device, and contrast that with the situation today when very much higher-priced appliances are being sold in large numbers, you will see that this educational work has been well worth while.

"It all helps to make women and men customers appreciate how important the electrical man is in the community, and sometimes the dealer overlooks the fact that the man who meets the public should carry that impression to them, that the electrical concern is an important one.

"The N. E. L. A. might have undertaken the work which the society is doing, but it was realized that everyone was benefitted and that everyone should have a share, and the work would probably not have been successful had it been undertaken by any one branch of the industry alone.

"One of the things the society has taken up is harmful advertising. A good deal of this has been done in the past. One firm got out a series of full-page advertisements with headings something like this—"House burned down and reporter asked what caused the fire—the electric wiring." Can you imagine the effect of this upon the electrical contractor's business. We got at the firms who inserted these ads. and induced them to change them."

Mr. Wakeman also cited other instances of pernicious advertising and scenes in motion picture films which prejudiced the public against the use of electricity and told how the society had been instrumental in have them removed or altered. They had also gotten the confidence of the publishers of magazines to such an extent that when they got articles on electrical subjects they sent them in to the society to correct misstatements. A questionnaire had been issued to fire chiefs, asking them to make a record of the number of fires traceable to electrical causes; the questionnaires were now being collected and it was found that in 5,000 communities less than 3 per cent. of the fires were really caused by electricity, and of that one-half were not of a character we would call electrical fire in the accepted sense, being on poles, streets, and so on.

Another service which the society was getting out to their members, the speaker pointed out, was a monthly sales' service which suggested advertising copy. They wanted their members to use the daily newspapers, and so copy was prepared for them with proper cuts, the matrixes and cuts being supplied free to members, so that they could always avail themselves of properly written copy.

Then the society organized sales' campaigns. This year they were running their third "Electrical Christmas" campaign and were distributing displays, etc., calling the attention of the public to electrical gifts.

The society also had gotten out handbooks for range salesmen and lamp salesmen, and they tried to inculcate the fact that the salesman is not selling a range so much as the idea of cooking electrically, and likewise that the lamp sales man is not selling merely a lamp, but rather the effect. The question of industrial illumination was gone into very thoroughly, and this was a very important matter at the moment. The manufacturers could be shown what efficient illumination means in decrease of accidents and increase of efficiency. An industrial lighting handbook had been gotten out, and there had been such a demand for it that it had to be reprinted.

The society, the speaker pointed out in closing, had at its head the very biggest men in the industry. W. W. Freeman was president and the chairman of the executive committee is Chas. L. Edgar, vice-president of the General Electric Company. He mentioned this fact because he wanted his hearers to understand that no man was too big to ask to cooperate. In Ontario, he knew, there was a power shortage and an educational campaign was necessary to cope with the situation. But before long the Chippawa development would be complete, and then the cumulative effect of propaganda would be felt.

Prince Albert Extensions

The City of Prince Albert have commenced excavation work on a new extension to their water pumping station. The scheme calls for the construction of a new river intake pipe, suction wells and low head pump house building, together with the installation of four electric motors and steam turbine driven low and high head centrifugal type pump units. General arrangement plans for the work were drawn up by Mr. H. T. Pawson, late Utilities Superintendent, now Utilities Superintendent for the City of Sherbrooke, Quebec. The carrying on of the work has been handed over by the City Council to Mr. R. Wright, electrical superintendent, who will attend to the drawing up of detail plans and specifications, and tenders for the various materials will be called shortly.

The total expenditure involved amounts to $65,000.00., which amount has been authorized by the rate payers of the city and approved by the Saskatchewan Provincial Local Government Board. Debenture monies are now available in the City Treasury to finance the work.

A. Monro Grier at Electric Club

The Electric Club of Toronto had Mr. A. Monro Grier as its guest on Friday, October 22nd, and enjoyed to the full a most delightful half hour while Mr. Grier told them, in his eloquent way, about a trip he had made to England this summer. Mr. Grier is well known in Canadian electrical circles as president of the Canadian Niagara Power Co. and also president (now for the third term) of the Canadian Electrical Association, though to the rest of the world he is merely a prominent King's Counsel. The attendance was almost the largest in the history of the club.

Canadian Electric Corporation

The Canadian Electric Corporation, Ltd., have recently been incorporated with head office at Montreal. The objects of the company are to manufacture, produce, export and deal in all kinds of electric, railway and tramway apparatus and accessories. Among those interested are Laurette Genest, secretary, and Ronald D. Sutherland, Etienne Pelland and Joseph A. Roy, civil engineers. The company is capitalized at $1,000,000.

Design of Queenston - Chippawa Hydro-Electric Power Canal

A Paper Read by T. H. Hogg, Engineer with the Hydro-electric Power Commission of Ontario Before the E. I. C. Convention at Niagara Falls

The power canal for the Queenston-Chippawa Development is one of great interest both from the economic as well as from the hydraulic side. A history and detailed account of the design will not be given in this paper but rather a general description of the economics and hydraulics of the canal that is under construction, together with certain details of the methods that were employed in attacking the problems of design.

The canal is divided into four sections. The first of these is the Welland River section 21,000 feet in length, with a bottom slope 0.000119 and side slopes of 2 to 1. This is being excavated by means of dipper dredge and cableway. The earth section which follows the river section is 6,250 feet long with a bottom slope of 0.0001208 and is to be rip-rap lined with finished side slopes of 1.5 to 1. For each of these sections a roughness factor of .035 in Kutter's formula was used. The earth section of the canal was originally designed as a concrete lined section of much smaller cross-sectional area, but a study of the economic, constructional and operating conditions indicated the advantages of the larger section with the rip-rap lining would be sufficient to compensate for the cost of the extra excavation. This portion of the canal has a capacity of over 15,000 c.f.s. with uniform flow at the assumed roughness factor of 0.035, and extreme low water in the Niagara River at Chippawa.

At the end of the earth section is located a transition, 300 feet long, in which the trapezoidal cross-section is changed to the rectangular rock section of 48 feet finished width with concrete sides and bottom. Beyond this are the control works, which are described in the paper by M. V. Sauer.

The rock section proper is 36,252 feet long and is divided into two parts by the Whirlpool section which has a length, including transition, of 2,450 feet. The rock portion of the canal has the water section with concrete lined sides and bottom with a finished width of 48 feet. The bottom slope is 0.0002113 and the roughness factor used in Kutter's formula 0.014. This value is conservative in view of the proposed method of placing the concrete lining. With the steel forms that are to be used and the special provisions being made for alignment of the forms, a smooth plane surface will be obtained on the concrete facing.

For 13,500 feet the concrete lining will be carried up 32 feet above the finished grade of the canal, for the next 11,500 feet the lining will be 31 feet high and for the remainder 30 feet high, except in the Whirlpool Section where it is carried up to elevation 563.0. For the greater part of the time the water surface will be above the top of this concrete lining but the friction loss will be reduced by the lower velocities that will then exist in spite of the greater roughness of the unlined rock. Numerous hydraulic studies have been made to determine the surface slopes in the canal for various discharges and for various water levels in the Niagara River. In cases where the water surface was above the top of the concrete lining a composite roughness factor was used in which the proportions of the wetted perimeter on the lining and on the rock surface were taken into account. Roughness factors as high as 0.019 resulted in some of these instances.

Determination of Depth and Slope

The depth and slope of the rock section were fixed by an economy study and the decision to use a concrete lining throughout its length was also reached in the same way. The method of arriving at the economic section of the canal will be explained later.

As examination of the profile of the canal indicates that the rock surface falls far below the grade of the canal about Sta. 333, rising again to grade about Sta. 349. This occurs in the Whirlpool Section, which is located at Bowman's Ravine or the Whirlpool Gully. Here it is necessary to carry the canal partly on fill and to use a trapezoidal cross-section on account of the foundation upon which the canal is carried. A concrete lining is essential on account of the high velocities. The bottom width is 10 feet and the side slopes 1½ to 1. The slope of the bottom is the same as that of the rock section, viz., 0.0002113.

The Whirlpool section of the canal was designed to have the same cross-sectional area at the lowest possible operating level as that of the rectangular rock section. The minimum water level would be somewhat above elevation 542, which is the elevation of the curtain wall at the screen house. The area of the cross-section below 542 is the same for both and for greater elevations the Whirlpool section has the greater area so that there is no danger of the canal capacity being "choked off" at this point.

In locating the Welland River section the river course was closely followed so as to take advantage of the area of

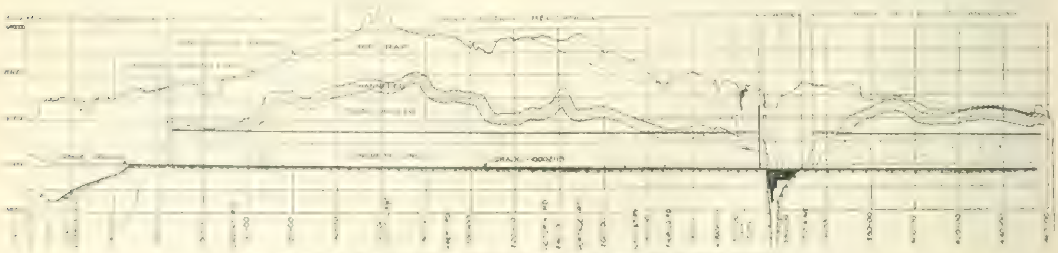


Fig. 1—Profile of Queenston-Chippawa power canal, exclusive of river section.

the natural channel. This necessitated leaving in all bends that occured in the unimproved stream. As the deflection of these curves is not great they will not produce any appreciable loss.

The first important change in direction occurs at the beginning of the earth section at Montrose and is followed by a second bend at the Michigan Central Railroad crossing at Montrose. In addition to these there are only five changes of direction in the rock section of the canal, the deflections of which are 51, 27, 31, 33 and 46 degrees. The radius of curvature in every case is 300 feet and this radius is used for the inside and outside of the bend as well as for the centre line. That is, the curves of the two sides and the centre line of the canal are not concentric, resulting in a greater width of canal at the middle of the bend than at either end, the expectation being that the energy losses will be less than in a bend with concentric curves. It is probable that a shorter radius than 300 feet would give even better results, but this minimum was fixed by the size of the electric shovels that are being used for the excavation of canal.

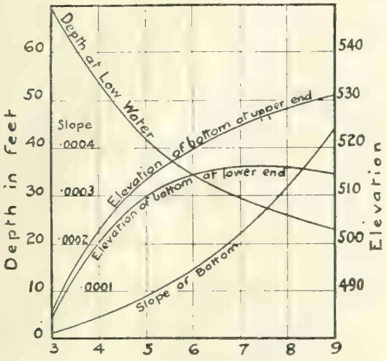


Fig. 2

The question of surges of the water surface in the canal, due to changes of load on the plant, is of great importance. This problem has received an amount of study proportionate to its importance, but on account of the limited space of this paper, it will be sufficient to say that the sides of the canal and the floor of the screen house will be built to such an elevation that with the worst combination of conditions the water will always be contained within the sides of the canal.

Observations of river stage at Chippawa have been available since 1902 and show a minimum W. S. elevation of 558.5, which low stage was reached only on two days. An examination of the past records of Lake Erie stage indicate that as low a stage as 558.0 may be posisble at Chippawa. This latter water-level is therefore treated as extreme low water and the canal is designed to carry full load at this stage of the river.

While the low water conditions control the size and slopes of the canal, on the other hand the mean water conditions were assumed to be those on which the economic proportions should be based.

Designs of Canal Section.

Certain limitations were met with at the outset. The Welland River section of the canal had to be maintained as a navigable stream, and as the excavation is in earth this portion of the canal was therefore designed for a low non-scouring velocity. The minimum width of the rock section was fixed by the type of electric shovel used for excavating this portion of the canal and was placed at 48 feet.

The problem thus resolved itself into selecting the best proportions for the trapezodial earth section and the best depth and slope for the 48 foot rock section. The procedure in the latter case is the one that will be described

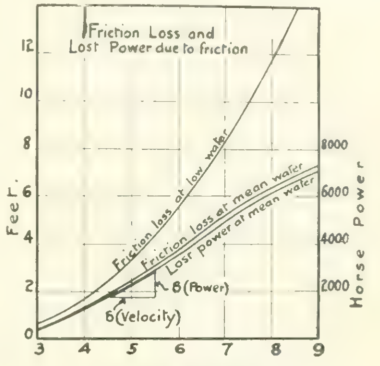


Fig. 3

It is, of course, possible to design any number of canals 48 feet wide, but with depth and slope varying so that all will give the same discharge at low water. For a low velocity the wetted cross-section must be deep but its slope may be moderate. For a high velocity the depth of the wetted cross-section will be small but the slope may be so great that the depth of the cut at the down-stream end may be greater and the total cost of excavating greater than for the low velocity design.

The procedure in determining the economic depth was as follows:

First, the design of a number of cross sections for velocities of 3, 4, 5, etc., feet per second, the determination of the requisite slope of the bed in each case to give the full load discharge with uniform flow, and the determination of the variation in cost of these canals with low water velocity.

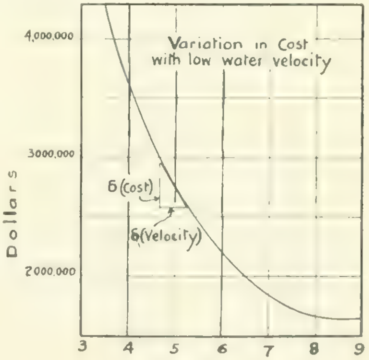


Fig. 4

Second, the determination of the friction loss in each of these canals with the river stage at its mean value. This friction loss represented so much lost power, which was, of course, small in amount for the lesser low water velocities, and greater as the low water velocity increased up to a certain point.

Third, the plotting of the different curves for items 1 and 2 thus showing the variation in delta cost with low water velocity and the variation in delta power with low water velocity. From these two differential curves a third curve can thus be obtained giving the value of delta-cost by delta-power plotted against low water velocity. Thus there is obtained what will be called an economy curve, showing for any given low water velocity, the rate at which further gains in power may be made at any low water velocity by enlarging the canal slightly and so cutting down velocity and friction loss.

Fourth, the selection of the best low water velocity from this economy curve. This step will now be explained.

The gain in power which results from a slight enlargement of the canal comes as a result of the reduction in friction loss. The additional cost for power house equipment is so small, within the limits in which we are working that they can be neglected. It is reasonable then to contnue the enlargement of the canal until the interest charges on the cost of excavation for the last horse power gained are equal to the average value of the power from the whole plant, including interest, depreciation, operation and maintenance. By stopping short of this point we would be in a position to gain more power at a cost less than the average that we were willing to pay for the power from the whole plant. It is interesting to note that the economic velocity determined in this way is but slightly greater than the minimum cost at which the canal could be built to get the required discharge at low water. The minimum cost occurs for a velocity somewhat greater than the economic velocity.

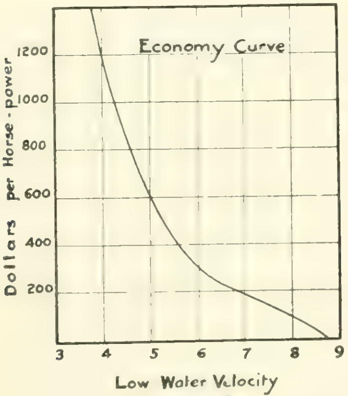


Fig. 5

The advantage for this method of attack is that it permits an economic size to be selected for the canal without the inclusion in the estimate of the cost of anything that does not vary with the low water velocity. In this case, the width of the rock cut being fixed, the earth excavation does not vary with the various designs for the rock section and as a matter of fact in computing the cost of rock excavation only that below some assumed horizontal plane at a lower elevation than natural rock surface but above canal grade was considered.

Figures 2 to 5 illustrate a typical economic canal study. The studies from which these figures are taken were for a canal of smaller capacity and greater roughness than the one being built, so that the curves show the method only and do not apply to the present canal.

Figure 2 shows the results obtained in designing for various low water velocities. These designs can be made only when a previous study for the earth section has been completed so that the elevation of water surface at the end of the earth section is known.

Figure 3 shows friction losses and lost power due to friction. The method of obtaining the first derivative of the lost power curve is also indicated.

Only the variation in cost, not total cost, is shown in Figure 4. It is evident that the shape of this curve is the same whether we include the whole cost or only that part which varies with low water velocity. In either case the first derivative will have the same value.

The determination of the form of the economy curve Figure 5 is explained above.

The procedure in the economic design of the earth section of the canal was similar to that for the rock section but somewhat more complicated by reason of the fact that certain changes in the design of the earth section involved changes in the excavation throughout the length of the rock section. The difference in procedure was thus largely a matter of properly taking care of all the variations in cost.

Investment Bankers' Association Passes Resolution to Effect that Public Utilities must be Kept on Sound Financial Basis

The following was unanimously adopted by the Board of Governors of the Investment Bankers' Association of America, October 3, 1920:

"Whereas, sound and constantly expanding public utilities are essential to the welfare and prosperity of the communities served:

"Whereas, the conditions resulting from the war have increased the costs of utility operation and of new money required for expansion, and prevented the growth of utility service to meet the increasing requirements of the public and of industry:

"Whereas, there is a recognized shortage of electrical power, and it is of vital importance to the industries of the country that means be found for providing additional power supply:

"Whereas, the street railway systems are so tied into the business of the nation that their rehabilitation, maintenance and growth must be permitted and provided by the public dependent on their efficient service:

"Whereas, the telephone and telegraph have become so important in our daily business and social life that they must extend their service daily to meet the public demands:

"Whereas the diminishing coal resources and the increasing demands on the oil supplies throw additional burdens on the gas industries which can be met only by their expansion:

"Therefore be it resolved: That it is the sense of the Board of Governors of the Investment Bankers' Association of America that there should be co-operation between the investment bankers and the owners and operators of utilities, and the regulating officials, in laying before the public full information respecting the vital importance of prompt and continuing expansion of all kinds of utility service, and in encouraging such utility regulation as will provide sound credit as the basis for financing, to the end that the investing public may provide the necessary funds by investment in sound public utility securities:

The Measurement of Maximum Demand and the Determination of Load-Factor

By Mr. Perry A. Borden*

Since Hopkinson in 1892 first suggested the idea that the distribution of a customer's load throughout the day should have some bearing upon the amount which that customer should pay to the Central Station for his power, the subject of demand and load-factor measurement in its various aspects has been many times discussed. In the determination of watts, amperes or any similar electrical quantity we have definite units upon which to base our measurements, and there is little room for controversy. But, when the quantity "demand," being a more or less mathematical concept, embodying the combination of electrical units with time in a rather indefinite way, comes under consideration, very divergent views as to its nature, measurement and true significance may be and have been expressed.

The object of the present paper is not to introduce any radically new ideas, nor is it to advocate any particular policy as a panacea for all difficulties which beset the rate maker in his work. It is rather to give a bird's eye view of the situation as it exists today; and, in an endeavor to reconcile some of the different opinions on the subject to show an actual comparison of the performances of a number of demand-measuring devices. And from this comparison have been deduced some interesting facts which would seem to have an important bearing upon the present day status of industrial load measurement.

For the purpose of a systematic study of the measurement of electrical demands the subject may be divided into three natural sections as follows:

1. The electrical quantity upon which the measurement is performed.

2. The method by which the measurement is accomplished.

3. The results obtained by the several methods upon a variety of types of loads.

Although these aspects of the subject are closely related, they will be considered as independently as possible, one of another.

I. The Quantity Measured.

In the establishment of a scale of charges for electrical energy the rate-maker at once recognizes the fact that he has the choice of a number of electrical quantities upon which to base his calculations. These quantities are affected in various ways by the nature and magnitude of the load under consideration. If the value received by a consumer from a certain amount of electricity were in direct proportion to the expense incurred in placing that electricity at his disposal, the problem of establishing charges for electrical power would be immensely simplified. Unfortunately, however, such is not the case; and the problem becomes one of finding a middle way between an absolute flat rate, based only upon the installed capacity of the load, and a straight energy charge established upon the readings of a watt- meter.

In hydro-electric power plants, where the fuel costs are nil, and the apparatus may be run at its ultimate capacity at practically no more outlay than at very light loads, the limitation of output is the capacity of the equipment. In fuel-consuming plants, where the combustion of coal or of oil is the source of energy, the cost of fuel, (the only item of cost whose value bears any direct ratio to the energy output), is seldom over half the annual expense of the undertaking, the remaining charges being practically dependent upon the capacity of the plant. In either case, therefore, the relationship between the watt-hours supplied and the cost of operation is a very indefinite one. The main object to be attained is that of keeping up the load factor; and the logical way to produce this result is to encourage each customer to do his share. It has of course been demonstrated that cases may exist where it is desirable to have on the system a customer with a low load factor, who, by placing his peaks at the disposal of the Central Station, may serve to fill up the valleys in the load curve caused by another customer who cannot so well control his demands; but practically all such cases are of a particular nature; and as such, need not be considered under the general head. The most natural way to encourage a high load factor is by the production of a direct reaction upon the customer's pocketbook, and hence the justification of the use of demand in the establishment of rates.

The "capacity of the equipment" referred to in the former paragraph is a term which in itself might furnish material for much discussion, and its very uncertainty adds much to the intricacies of the problem of demand measurement. To the mechanical engineer such a term would present little difficulty, as it would merely signify a power value beyond which the weakest link in the system would fail. But to the electrical engineer the matter of heating of equipment is usually fully as important as any purely mechanical feature; and this heating is not in direct proportion to the amount of energy delivered to the consumers.

The temperature rise of a piece of apparatus is governed by the relation of the energy losses therein to the facilities for dissipating the heat generated, and to the time allowed for the heat to distribute itself away from its source. All of these factors are subject to great variation. If then, we wish to base our charge upon the capacity of the plant or investment necessary to provide power for the customer in question, we must pay some consideration to the temperature rise of our equipment due to his load. This means that, to obtain a fair basis we should endeavor to determine the energy loss produced in our equipment by the load under consideration and to incorporate this value in his power bills.

The direct measurement of loss, while possible on a single unit by use of a differential wattmeter, or by other means, is not practicable where the one bus supplies a number of independent loads. It is desirable, therefore, to install upon each circuit that type of measuring instrument whose indications bear the closest relationship to the energy losses in the supply system. Hence the question, "What electrical quantity shall we measure?"

As possible answers to this question, consideration is given to the following quantities:

(a) Watts (Real Load).

The majority of the present day demand meters operate as wattmeters and give the maximum demand of the load in watts consumed. This method has the advantage that it is universally applicable to all classes of loads,—direct and alternating, single-phase and poly-phase, balanced and unbalanced. This value while representing the demands made upon the mechanical portions of the system, is not of necessity proportional to the heating effects.

---

*Engineer, Hydro-Electric Power Commission of Ontario, before the A. I. E. E. at Philadelphia.

(b) Volt-Amperes (E I)

Since for a given energy load, the heating of equipment is manifestly greater at low power factors than at high, a consideration of volt-amperes without regard to the actual energy supplied will have a tendency to encourage operation at high power factor, and thus reduce energy losses. This method is already used to a considerable extent by the employment of a watt-demand meter whose readings are coupled with those of a power factor meter at the time of the maximum demand. This scheme, however, or the use of a reactive-volt-ampere-meter in conjunction with a watt-demand meter involves the use of two instruments, one at least, of the curve-drawing variety; and is, therefor, suitable only for comparatively large loads from which the revenue would be sufficient to justify the expense of the equipment.

The volt-ampere meter has not yet been developed in a form suitable for direct determination of maximum demand, and does not at this time appear capable of such development, at a price to compete with the watt-demand meter on ordinary commercial measurements.

(c) Amperes (I)

. The earliest types of demand indicators were dependent for their indications upon current alone. And, since it is the current which is responsible for the heating of conductors, there should seem to be justification for their use. On polyphase circuits, however, they are likely to introduce confusion and uncertainty.

(d) Amperes Squared (I^2)

As the heating of a conductor is directly proportional to the square of the current flowing, it would seem that an instrument measuring demand upon this basis would find a certain sphere of usefulness. Such a meter would be identical in its principles with an ampere-demand meter, but would have an inherently uniform scale. Its construction, to operate upon either a thermal or an electromechanical principle should be quite practicable. It would, however, on unbalanced loads, be subject to the same limitation as the ampere-demand meter.

(e) Actual Energy Losses ($K E^m + R I^n$)

As stated above, while it is possible to measure the actual energy losses in a simple system, where but one load is fed from the portion of the plant under consideration; it is not practicable, when several loads are fed from one source, to apportion the responsibility for the energy losses without the most intricate mathamatical operations and complicated metering equipment. The accurate measurement of energy losses under ordinary working conditions may be looked upon as a matter of purely academic interest and here laid aside in favor of some more practical if less precise method.

Summary—Part I.

1. A fair and equitable charge for electrical energy cannot be made on a basis of energy consumption alone. Some consideration must be made of the customers' demand upon the capacity of the plant.

2. In the determination of demand, cognizance should be taken of the heat produced in the equipment by the load under consideration, as well as of the mechanical limitations of the plant.

3. While the mechanical limitations of thé plant bear a direct relationship to the energy output, the heating limitations are in direct proportion to the energy losses in the electrical equipment

4. Energy losses cannot generally be measured, and are usually very difficult to estimate accurately.

5. Energy loss may be expressed as the sum of a function of the voltage and a function of the current; and considering the complicated nature of the expression necessary to give a precise representation of this value, the voltage may usually be considered as constant, and the loss said, with little sacrifice of accuracy, to vary as the square of the current.

6. An exact apportionment of the I^2R losses among several loads fed from one system is made difficult by the fact that, while the total loss varies as the square of the total current, the ratio of the losses due to the respective currents is an indefinite quantity, depending upon a number of variables whose values it is not practicable to obtain.

7. Since the true basis for demand measurement is an exceedingly evasive quantity, not capable of determination under practical working conditions, it is necessary that some compromise be made, and the nature of this compromise must be subject to local conditions and to personal opinions on the economic questions concerned.

8. Tests would seem to indicate that, though voltamperes cannot be said to be an exact representation of the quantity upon which demand would be based, they furnish us with a definite quantity whose value approaches nearest to the desired approximation.

II. The Method of Measurement

In the present state of the art, there are recognized several methods of determining demand: These include measurements from the charts of graphic recording instruments, and readings obtained from specially designed demand meters. While from an analysis of the graphic meter chart it should be theortetically possible to determine the average power for any period and to select the greatest of these averages as the maximum demand, any person who has tried to do this with the chart of a load having any considerable degree of variation realizes that a positive determination of the true average over a chosen period is seldom practicable.

The only workable method of measuring maximum demand from graphic meter charts is by selecting that portion of the curve during which the indication remains at its highest value for the duration of the required time period. This is known as the "Sustained Peak." While the use of this quantity, in that it cannot exceed the true maximum intregated demand, might well meet with the customers' approval, it may be very unfair to the central station, in that the value obtained cannot be higher than the minimum point of any depression which may occur during the period of maximum demand. Moreover, the depth of any instantaneous minima of the load curve as drawn by the graphic instrument will depend greatly upon the amount by which the meter movement is damped.

Since the ordinary curve-drawing meter does not justify its use for the determination of demand, it becomes necessary to investigate the possibilities of the various types of demand meters which, from time to time, have been developed; and to examine their principles of operation.

Among the numerous types of demand instruments now known to engineers there are recognized two groups, which are classified according to the principle of operation rather than the quantity measured. These classes are as follows:

1. Those from which an integrated value of the load is obtained.

2. Devices which are time-lagged and cannot, in the ordinary sense of the word, be said to give an intregated value.'

Integrated Demand Instruments.

The quantity determined by this class is usually the ratio of the total integrated value of the load consumed in the time interval to the time of the interval. This class naturally falls into five subdivisions of which, as we proceed, I shall endeavor to briefly describe one or more types to be found in each.

(a) Curve-drawing meters include all meters which give a continuous line record or chart of the quantity measured. From the charts so obtained it is possible by measurement or by integration to gain very complete information as to the load, its peaks, its total value and its demand over any desired period. But as shown in a previous paragraph, the systematic use of such instruments for the accurate measurement of demand is seldom practicable.

(b) Instruments which graphically record the demand of each successive time interval as fixed by a clock or other timing device, time also being recorded. The demand in each clock interval, and therefore the maximum demand, can be obtained from the record. This type and those in the two following classes operate upon what is known as the "Merz" principle, and are subject to the disadvantage that, the time periods being selected by a clock, no cognizance is taken of load conditions immediately previous or subsequent to each individual demand. The clock being unable to select the period of maximum power, the maximum demand as obtained from such an instrument is only the greatest of those demands which were measured by the individual meter in question. Two similar meters installed upon the same load, unless the tripping mechanisms operate in synchronism, need not indicate the same value. As examples of meters in this class may be named the General Electric type G meter, the Westinghouse type R A and the Piek or the N. E. I. C. meter.

(c) Instruments which, at the expiration of each time record, make upon a tape or chart, a record of the reading or of the advance of an integrating meter. These meters are very similar to the foregoing class, except that whereas in the former, the record is graphic, in this case it is in figures. The "Printometer," now known as the General Electric type P demand meter is the best known example. The instrument contains a set of cylometer type-wheels which are electrically interlocked with the register of a watt-hour meter. They are moved forward at a rate representative of the flow of power through the meter; and will, therefore, at any instant give an indication which is equivalent to the reading of the dial. Through the agency of a rubber platen and a copying ribbon, this reading is printed on a paper tape. The outfit is not self-contained, the demand indicator being separate from the clock and the meter, and requiring, like the type G, a contact-making device to be fitted to the register of the meter.

(d) Instruments which indicate, but do not record the maximum demand, the time intervals being fixed by a clock or other timing device. In meters of this class the reading is obtained from a pointer, which must be manually reset to zero, and which gives only the maximum demand since the last previous resetting. As examples of this class may be named the general electric type M (formerly the Maxicator) and the Siemens demand meter.

In its general principles the type M is similar to the type G. As the stylus is replaced by a pointer, however, it is not automatically returned to zero. The mechanism which forces the pointer across the scale returns periodically to zero but the pointer remains at a maximum deflection, and is reset by hand when the meter reading is taken. Instead of a clock, the M 4, for alternating currents, has for a timing element a constant-speed motor similar in its construction and operation to the moving element of an ordinary watt-hour meter.

The Siemens meter consists of a demand indicator mounted in the same case with a watt-hour meter of the standard type. The clock is a small, electrically-driven unit which by means of a cam mechanically actuates the tripping mechanism. A driving dog periodically geared to the watt-hour mechanism impels a pointer around a graduated scale, and the position the pointer indicates the maximum deflection of the dog, and hence, the maximum demand, since the pointer was last reset. At the time of reading the meter, this pointer is manually reset to zero. The Siemens meter, being of the purely indicating type, requires no attention other than the periodic reading and setting of the demand pointer.

A considerable number of meters using the Merz principle have been developed by British and European manufacturers but these differ from the Siemens meter only in details of construction.

(e) Instruments which make a record on a tape or chart when a certain fixed and predetermined amount of energy has been consumed, time also being recorded. This class differs from class (c) in that the demand is shown for any time interval, irrespective of when the interval began and ended. In other words, when a predetermined amount of energy has been consumed, a record is made, while in class (c) instruments a record is made when the predetermined time interval has elapsed. It differs from class (a) in that the record is not a continuous one but periodic. Example: Ingalls demand recorder. In this meter the general scheme of operation is similar to that of the General Electric type P but the functions of the timing and recording elements are interchanged. A dot is made on the paper tape after the consumption of each pretermined block of energy. The rate of consumption is obviously great where the dots are most numerous.

Numerous attempts have been made to develop a meter which would overcome the selective characteristic of instruments of the Merz type; but owing to their mechanical complications, these cannot be said to have found sufficient favor to justify their production in quantities. A special instrument developed for this purpose by the writer is described in a later section of this paper.

Lagged Demand Instruments.

A lagged demand instrument really comprises an indicating meter in which a retarding device is used, so that a definite time period must elapse before the full value is indicated. The time interval is independent of clock time.

The value measured by instruments in this general class differs from the integrated value by an amount which depends upon the particular type of instrument and the character of the load curve. With a perfectly steady load, all instruments of this class would indicate practically the same value as integrating instruments, but with a fluctuating load each type may give a different result. Hence, when referring to demands measured with instruments of this class, the particular type of meter employed should be mentioned The class may be subdivided in the following two types:

(a) Instruments in which the rate of motion of the indicator over the scale is always proportional to the load. Example: Westinghouse type R. O. meter.

The Westinghouse type R. O. watt-hour demand meter, which made its appearance six years ago, embodies some distinctly original features. It combines in the one mechanism a wattmeter and watt-hour meter, both actuated by the same electromagnetic elements. The wattmeter is prevented from registering the instantaneous value of the load by an escapement operated from the watt-hour meter shaft. The indicating mechanism, therefore, constantly endeavors to indicate the load; but can only approach that value (as long as the indication is less than the load) at a rate proportional to the load. Since the speed of travel is proportional to the load, it will be seen that an indication of any sustained load will be attained at the end of a definite and constant time interval. The time period is thus established independently of any clock. Engaged with the indicating mechanism is a maximum pointer, which, by indicating the greatest deflection of the wattmeter element, determines the maximum demand.

Several instruments measuring substantially the same quantities as the R. O. meter have recently been patented, but as they have not made their appearance on the market it is not necessary to refer to them here.

(b) Instruments in which the rate of motion of the indicator decreases with the time of deflection. Examples: Wright, Reason, Lincoln type R. H., General Electric types W and H.

The Wright meter is in principle a differential recording thermometer which measures the heat produced by an electric current. It consists of two bulbs of approximately the same size, connected by a U-tube filled with liquid and provided with a third tube; in close promixity to which the scale is fixed. The current is carried through a heating coil wound on one of the bulbs. The heat produced causes the air to expand and to depress the column of liquid in one side of the U-tube, causing it to rise in the other and overflow into the reading tube. The height to which it finally rises is an indication of the maximum value of the current which has passed through the coil.

The Reason demand meter is a similar piece of apparatus in which the glass tube is tilted by the measured current flowing in a solenoid, thus allowing the liquid to flow into the reading tube. Both this and the preceeding type, being unaffected by the voltage of the circuit are purely ampere-demand meters.

The Lincoln type R H. meter operates upon the principle of heat storage. By an ingenious, though simple arrangement of transformers and resistors it has been practicable to obtain a thermal quantity which is directly proportional to the energy in the circuit. An expanding spring connected to a deflecting pointer enables an indication to be obtained of the watts passing through the metering element, and the instrument constitutes a true thermal wattmeter. The time element is introduced by loading the heaters with metallic masses, which do not instantly respond to temperature changes. Upon any change in load, the temperature of the mass begins to change and continues to do so until the rate of heat loss balances the rate at which energy is being supplied. This change in temperature takes place according to what is known as a logarithmic law.

The General Electric type W demand meter is essentially a polyphase watt-hour meter with both electrical elements acting upon one disk, and a very strong damping system acting on the other disk to produce the necessary time lag. The rotating element is opposed by a series of springs which permit the disks to make three complete revolutions while the pointer makes one revolution. The instrument thus becomes an indicating wattmeter, very much over damped. This meter is usually constructed to have a time period of five minutes.

The type H is a thermal instrument and records the maximum current. The instrument works on a differential thermometer principle. Two similar thermostatic springs are mounted on studs, their free ends being connected by a cord which passes over a spindle, the latter carrying an arm which engages the pointer. The air temperature affects both springs to the same extent, thus causing no deflection of the pointer for its variations. In one of the two spring-supporting studs is contained a heating element through which the main current is passed; thus when current is being used, the temperature of one spring is raised above that of the other, causing the shaft to turn, and so produce a reading. This instrument combines in its principles the idea of the logarithmic increment of temperature, with that of the flow of heat along conductors.

The demand meters referred to above include only types which are now, or have been in actual commercial use. It is not the intention to convey the impression that these are all the types that have ever been developed. To obtain an adequate idea of the multitude of methods and principles which have been proposed for the measurement of this elusive quantity, it is necessary only to refer to the records of the Patent Offices for the past fifteen years.

A considerable number of "Excess Meters" have from time to time made their appearance but as these instruments cannot properly be considered as coming under the head of "Demand Meters," they are not given consideration in this paper.

Lighting the "Movies"—From Report of I. E. S. Convention Proceedings

A radical improvement in the methods of lighting motion picture theatres is proposed. It is based on the principle that a picture having a certain degree of contrast between the high lights and the shadows may appear more or less contrasted according to whether the eye is operating at a high or low adaptation level. If the conditions are such that the retina is operating at a low adaptation level, such that its sensibility to contrast is low, an increase in the apparent contrast can be obtained by so changing the conditions of illumination that the retina operates at a higher level when its sensibility to contrast is greater. On account of this it is possible to use more general room illumination to make the picture appear more contrasty than if less room illumination is used. It was found by test that by means of indirect lighting to produce a graded illumination on the table plane (30 in. above the floor) ranging from .04 ft. candle near the front to .19 near the back and with ceiling brightnesses of from .12 millilamberts near the front to 8.4 millilamberts near the rear of the auditorium that the photographic quality of the picture was not reduced. The observers were unanimous in the decision that not only was the quality of the projected picture fully as satisfactory but that the effect was more pleasing and resulted in much greater visual comfort and less eye fatigue. A medium grey color for the screen surroundings was found to be better than black or white. With the illumination as described an observer entering the room with his eyes adapted to full exterior daylight, could immediately see all details of the furniture of the room and in one or two minutes could easily read ordinary print. Several practical schemes for utilizing this method were illustrated.

Power from Gaspereaux River

The Gaspereaux River Light, Heat & Power Co. Ltd., has been recently incorporated. The plant is situated near Wolfville, N. S. It is also planned to erect a pulp mill to manufacture about 2,500 tons per year. At present they are supplying the Wolfville Electric Light Commission with power and light. The officers of the company are as follows: President, C. H. Wright; vice-president, Mrs. A. L. Wright; sec.-treas., R. A. Jodrey.

A deficii of $200,000 in the operation of the Manitoba Government telephone system for 1920 has been announced by Premier T. C. Norris, who stated that increased rates will be necessary. The deficit is due mainly to increased wages and operating expenses, it is reported.

Contract will be let for electrical work on $15,000 hall being built on Broadview, near Danforth Ave. R. G. Smith, 870 Carlaw Avenue, general contractor.

Relative Advantages of Modern Steam and Electric Locomotives

By F. H. Shepard*

The transportation problem is about the most serious one which now confronts us. For a number of reasons, for only part of which the railroads are responsible, provision for the movement of railroad traffic has fallen far behind the productive capacity and needs of the country to-day. At the same time, the demand for traffic movement will undoubtedly be doubled in about twelve years. So the question arises, what are we going to do, and how are we going to do it?

The way to move traffic is to **move it—to keep it moving.** The yearly average of 22 miles per day for a freight car for the whole country, with monthly averages of as low as five miles on some of our most congested railroads for a single month, emphasizes the fact that this is a problem that some how, some way, we must solve. The solution lies, to a large extent, in railroad electrification.

With the present standards of train make-up, classification and terminal handling, electrification will double the capacity of any railroad. With the better equipment we can expect in the future, together with the evolution of improved methods of operation contingent on electric power, this capacity should be doubled again, thus securing four times the present capacity. This should certainly be accepted as vision of the future, and why not our aim? Unless some broad and consistent program is embraced, the situation, which is serious indeed to-day, may well be calamitous to-morrow.

The electric locomotive has generally, thus far, been a mere substitute for the steam locomotive, although, in some cases, due to the greater power of the electric locomotives, there has been a modication of the handling of traffic.

Two conspicious cases of this have been the Norfolk & Western and the Chicago, Milwaukee & St. Paul. In the case of the Norfolk & Western, two electrics handle the same train as was formerly handled by three Mallet engines, but at twice the speed. In this operation, owing to the great increase in hours of road service as well, one electric locomotive is the practical equivalent of four of the Mallet engines replaced.

On the C. M. & St. P.

On the Chicago, Milwaukee & St. Paul, the notable change has been the elimination of intermediate terminals on the electrified section between Harlowtown, Montana, and Avery, Idaho, 440 miles long. There is at present a single intermediate engine terminal, but the latest passenger locomotives are detached from trains at this terminal for inspection and work only, which takes place about once in each eight or ten trips. On regular schedule, these engines make a run of 440 miles each day, being taken off for inspection at Deer Lodge after mileage varying from three to five thousand miles. On occasion, when, due to a schedule derangement, engines have been maintained in continuous road service for periods of thirty hours or more, for a full day of twenty-four hours, mileage records of up to 766 miles in this mountain service have been established. These records are truly indicative of what may be expected with electric power.

The advantage of electric power is its flexibility and mobility. The difference between locomotives, steam and electric is fundamental. The steam locomotive carries its own power plant, while the electric locomotive, on the other hand, is simply a transformer of power. The design of the locomotive is circumscribed utterly by the necessity of tying up the rest of the machine to a steam boiler. On the other hand, the electric locomotive assembly can differ amazingly as to type, length, axle loading and driving connections. A group of small motors does not differ materially from a single large motor in efficiency. The speed and power, therefore, of an electric locomotive is limited only by conditions of track and construction and condition of car equipment. It thus becomes entirely practicable to build an electric locomotive to take any train which will hold together, over any profile whatever, and at any desired speed. Therefore, it should easily be practical to very greatly increase the speed of our freight trains so that they could all run at a common speed not very different from that at which the superior trains are operated.

Material Increase in Weight

Again, with the retirement of the lighter and weaker car equipments, a material increase in the weight of trains will be realized. Without the limitation in train speed commonly accepted as a handicap to operation of tonnage trains, who can say what the limit to train load will be with electric power. In fact, the character of railroad operation which may be secured with electric power has not yet been visualized. Every other industry that has been electrified has experienced a revolution in methods and service due to electrification. This should be equally true in the case of the movement of our railroad traffic.

Our present methods have been built up entirely under the necessities and limitations of the steam locomotive. This is evidenced by the existence of intermediate terminals at the ends of all the so-called districts, where all traffic halts. Again, the steam locomotive requires attention en route, needs supplies of water and coal, and, because of its slow movement when hauling our present tonnage trains, it is frequently sidetracked for superior trains, and thus there are more and still more halts to traffic.

Car inspection now takes place at the terminus of each engine district. If, under condition of electric operation, the engine district can be increased to 200, 400 or even 500 miles, is there any good reason why car inspection should not be eliminated at the present intermediate terminals. In fact, is not the general standard of maintenance of equipment of doubtful value on the present basis of inspection at each 100 mile interval. Cars in subway service, which is certainly full of potential hazard, are economically and reliably maintained through inspection at intervals of one to three thousand miles. The elimination of these intermediate terminals, with the resultant necessity of keeping the train moving on the main line, would secure an enormous increase in miles per car with a corresponding saving in equipment.

Furthermore, with the dispatch obtained in handling trains, movement could be so marshalled and scheduled that the necessity of storing goods at terminals to protect exports and local consumption would be largely eliminatgateways open instead of closed.

---

*Director of Heavy Traction, Westinghouse Electric & Manufacturing Co.

Coming now to the comparative performance of steam and electric locomotive, it is important to bear in mind their fundamental difference the one, a generator of power, and the other a transformer of power. The generation of power in central stations is surrounded with many refinements, and in the consumption of coal, there is every opportunity for skillful handling and supervision, so that the thermal efficiency of a modern central station is relatively high and is also continuously maintained. With the steam locomotive, on the other hand, the thermal efficiency is dependent not only upon the design of the locomotive, but the manner in which it is worked, its condition, which differs widely from the best, and finally by the skill in firing. The electric locomotive, on the other hand, consumes power only when in service, and works at any load at its designed efficiency. The average performance, in the case of the electric, approximates the maximum in efficiency, while the steam, on average performance, will differ widely therefrom.

We can therefore hardly expect that with the best steam locomotives the average coal consumption will be equal to twice the coal rate for the same work performed by electric locomotives with steam generated power. Obviously, with hydro-electric generation, the saving in fuel is complete. There is further economy due to the lesser work performed, because the electric locomotive does not have to trail supplies of fuel and water, nor is there need for the hauling of coal to points of local supply, which will always be greater than hauling to electric central stations.

There are a considerable number of different designs of electric locomotives all in successful operation, and each possessing certain advantageous features. Further experience will, undoubtedly, result in the survival of common types for the different classes of service. The great latitude with which electric locomotives can be designed, while fundamentally most desirable, is in itself at the present time, somewhat of a handicap. This is now the subject of intensive analysis and this study is undoubtedly developing as well, a better knowledge of the running characteristics of the steam locomotive.

To state the case briefly, we are all interested in the transportation problem. Electrification is bound to be the most potent factor for its relief. We should, therefore, invite and embrace closest co-operation with the engineering and mechanical skill which has been so productive in the steam locomotive field.

Winnipeg Electric Railway Co. Operating Seven Motor Buses in Residential District

Seven motor buses are now in service in Winnipeg operated by the Winnipeg Electric Railway Co. They are used as "feeders" to the trunk routes, and serve a residential district known as Westminster Ave. and Lipton St.

An accompanying photograph of the bus clearly indicates the general features. The type of bus was developed by the company's engineers to meet local conditions, and they were built by the Sterling Body and Carriage Co. of Winnipeg.

The chassis is a 1½ ton Sterling truck, and the body has a capacity of 20 seated and 15 standing passengers. The bus is operated by one man who controls the entrance and exit doors located at his right.

A novel feature of the design is the auxiliary rear exit, which is for use only in emergencies. The door is interlocked with a step which slides in and out on tubular guides. The door is opened and the step pushed outward by means of a strong spring which is released by a trigger at the driver's left hand. The manual closing of the door automatically returns the step to its normal place under the body. The bus is heated by means of the exhaust gases from the engines.

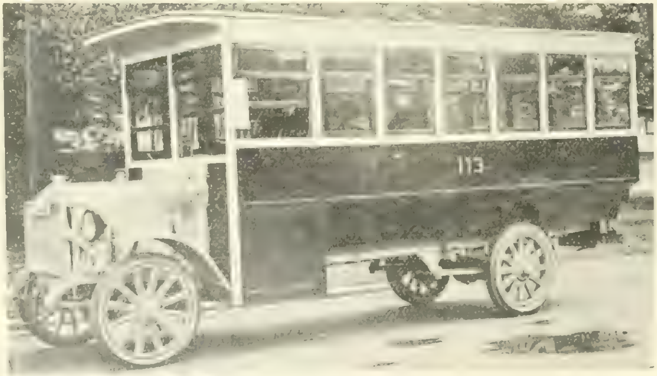
The experience of the company with the buses has been satisfactory, although it has conclusively proved that the motor bus is best used as a supplement to, rather than a substitution for, street railway service. The route they operate on is about one mile in length, and the total cost of operation averages 25.71 cents per car-mile.

They maintain a ten-minute headway on an asphalt pavement.

Engineers Chosen by Commission

Announcement has just been made by Major A. J. McPherson, chairman of the Saskatchewan Water Commission, to the effect that W. G. Chace, consulting engineer of Winnipeg, and F. L. Fellowes, city engineer of Vancouver, have been appointed consultants to that commission. They will report on the proposed scheme to supply the southern part of the province with water from the south Saskatchewan River.

Mr. H. R. Cassidy, 255 Regent Ave., Montreal, has been awarded the contract for electrical work on $12,000 garage under construction at 793 Pine Ave. W., Montreal.



One of seven motor buses operated by the Winnipeg Railway Co. Carry 35 passengers and operated by one man. A supplement but not a substitute for railway service.

The Contractor-Dealer

The Convention of U. S. Electrical Contractors and Dealers at Baltimore as Seen by C.H.H.—Canadians Had an Enjoyable and Profitable Outing

When the big convention of the National Association of Electrical Contractors and Dealers (Twentieth Annual), held at the Southern Hotel, Baltimore, Maryland, October 4th to 9th, inclusive, really started, Wednesday, October 6th, after two days of preliminaries, committee meetings, etc., Mr. K. A. McIntyre, Toronto, and Mr. C. H. E. Williams, Vancouver, executive committeemen for Canada, looked about for home-folk faces.

Canadians Who Were There.

Besides the committeemen, there had come from Canada, Mrs. C. H. E. Williams, Vancouver; E. F. W. Salisbury, J. W. Curran, Toronto; A. W. J. Stewart, Toronto Hydro; L. P. Stiles, sales manager Northern Electric Company, Toronto, and Mrs. Stiles; C. S. Barthe, Canadian General Electric, Toronto; H. F. Balhatchet, Benjamin Electric Company, Toronto; C. H. Hopper, Canadian Westinghouse Company, Toronto; Frank O. Ellis, Kitchener; W. G. Blay, Hydro, London; B. L. Baulch and Mrs. Baulch, Northern Electric, London; George F. Foot, Canadian Westinghouse Company, Hamilton; L. A. Johnson and E. C. McGovern, Northern Electric Company, Montreal; A. Lee Jones, Canadian General Electric, Montreal, and J. A. McKay, secretary of the Ontario Association Electrical Contractors and Dealers. And to make things look just about complete, Mr. W. M. Andrew, the original Canadian "Electrical Secretary," arrived. "Billy" immediately annexed himself to the Canadian bunch and invited everybody to visit him at his new office, 20 Vesey Street, New York, where he directs the activities of the Swedish General Electric Company in the U. S. A.

Baltimore is just below the "Dixie" line, and while Southern hospitality has lost some of its moisture, every Canadian who attended the convention stands ready to attest to the fact that it has lost none of its warmth. Good things to eat and worlds of entertainment. Special ladies committees took charge of Mrs. and Miss Delegate, and while the men attended the convention meetings My Lady was motoring about the city or through the countryside, or chatting over the tea cup at some pretty wayside inn. And every evening a dance in the main ball-room of the Southern.

After Mr. S. C. Blumenthal, chairman Maryland State Association, made the opening address, and Hon. Wm. F. Broening, Mayor of Baltimore, had welcomed the delegates, Mr. W. Creighton Peet, chairman National Association, took the chair and the convention was "off."

Mr. Thos. A. Whelan, president Fidelity and Deposit Company of Maryland, spoke on "The Industrial Outlook." Mr. Whelan pictured a bright future for business, basing his optimistic predictions on reports from several thousand agents of his house who had been requested to make a careful survey of business conditions in their respective territories throughout the United States. An interesting tabular summary of this survey is available.

Mr. J. M. Wakeman gave a short but interesting account of the purposes and activities of the Society for Electrical Development of which he is general manager.

Then came Mr. Lawrence L. Davis, special representative of the National Association. It is Mr. Davis' part to go into the field and give practical assistance and advice to dealers, collectively and individually, in matters pertaining to their business and their association. Davis follows Goodwin. "Bill" is the pioneer and trail blazer, while Lawrence W. gets right down to cases, camps on the job and points out what's to be done and explains how to do it. A dose of Davis is desirable and is hereby recommended.

The two outstanding features of Thursday's session were the instructive talk on "Sale of Motors for Industrial Uses" by Mr. J. A. Clark, Westinghouse Electric and Manufacturing Company, and the intensely interesting and valuable address on "Managing an Electrical Contracting Business" by A. L. Abbott, St. Paul, Minn. (Mr. Abbott's address is printed in this issue and should be read carefully by every contractor and dealer.) No feature of the convention surpassed it in interest and value.

Friday's session opened with an address by Mr. H. B. Kirkland, American Wire Mould Company, who talked about a "Two Billion Dollar Industry." Several Canadian delegates were seen industriously taking notes.

"Sam" Chase Recovered.

Mr. Samuel Adams Chase, Westinghouse Electric and Manufacturing Company, who, associated with Mr. W. L. Goodwin, General Electric Company, in the work of instilling the co-operative spirit in the electrical industry, is probably known to every contractor-dealer in Canada and the United States. Mr. Chase has been absent from the "trail" for several months because of illness, result of strenuous work for the cause. Now recovered, his return to the field, at this convention, was the signal for a veritable ovation. After a short talk on "Harmonizing the Industry," "Sam" was unanimously elected an honorary member of the National Association.

Goodwin's address was on "Scientific Merchandising," and it, together with Mr. Abbott's Thursday address on Contracting Management, constituted the "big thing" of the convention for the individual contractor-dealer to take home with him, put under his pillow and dream over. After telling the electrical merchant how properly to merchandise, Bill had something to say about the relation between dealer and manufacturer; particularly had he something to say, with characteristic directness, about compensation and margins, the good of this system and the bad of that system. The Goodwinian verbal wallops were landed with extra vigor on the "dumping" evil, which, he stated, frequently results from the receipt by an agent-dealer, for a manufacturer's product, in a large community, of a differential larger than that received by an agent-dealer in a smaller community, because of the former's ability to purchase in larger quantities, and thus permitting of the "dumping" of surplus stock by the former in the latter's precincts. Such a situation was pictured by the speaker—by way of illustration—with reference to washing machines. An agent-dealer in a large northern city where the servant problem is a strong ally would surely sell a greater quantity than the agent-dealer in a smaller city in the South where plenty of cheap domestic help is at hand. The Southern dealer not only has a smaller field but has to put forth more selling effort. The Northern dealer, because of his two advantages, can buy heavier but merits no more compensation than the Southern agent-dealer. And when Mr. Northern agent-dealer does get a substantial margin more than Mr. Southern dealer (and here Bill stopped jabbing with his left and swung with his right), he can use that margin to "dump" stock in the other chap's city any time his local sales fail to give him quick enough turnover.

Goodwin had his audience very much with him until he announced his early retirement (January 1st) from active work in connection with the "Goodwin Plan." This didn't meet with favor. Not for a minute. Goodwining without Goodwin seemed a limp and insipid prospect. Some of the stalwarts arose and said so, but Bill stuck, and said that by peering hard ahead he could see the end of the trail, or words to that effect, about the 1st of the year.

Seeing Is Believing.

The afternoon was given over to the illuminating men, and Mr. Ward Harrison, National Lamp Works, put on a demonstration of industrial lighting, appropriately termed "Seeing is Believing," which proved illuminating in more ways than one. And Mr. P. B. Zimmerman, Cleveland, pointed out the industrial lighting market and explained the contractors' part in selling it.

Mr. Harrison had arranged a room, approximately 60 ft. x 60 ft., the white walls of which were screened with removeable dark cheese cloth to represent the average condition of the walls of an industrial plant. A great many reflectors of different types, in combination with a great many lamps of different wattages, were attached to the ceiling. The audience sat around tables and each table had on it a foot-candle meter, sample color cards, and small electrical devices of different kinds. The audience took readings on the foot-candle meter and noted the different color effects on the sample cards as well as the diffusion on the small electrical devices.

The first demonstration was that of illumination obtaining in the average industrial works where dirty obsolete reflectors are equipped with dirty carbon lamps. The illumination was so low that a reading could hardly be taken on the foot-candle meter.

The next demonstration showed the effect of illumination using 2-foot candles. Demonstrations were taken at 10 and 20 foot candles and right on up to a point where the illumination was so intense that it was right off the scale of the foot-candle meter.

The screens were removed from the walls showing the before and after effect of painting the walls white, and readings were taken to show the increased foot candles obtained.

Another feature of the demonstration was a test made in reading an ordinary optical chart under different intensities. It was shown that certain letters could be read under 10 foot candles which could not be identified under 2 foot-candles. Similar experiments were made for speed with the result that letters could be read under the high intensity which could not be identified with lower intensity.

Readings were also taken on the foot-candle meter with reflectors in place and with reflectors elevated; arrangements having been made so that the reflectors could be raised above the lamps. Experiments were also made with direct, semi-direct and direct fixtures using daylight lamps, also reflectors equipped with bowl enameled lamps. Other experiments showed the difference between glare and illumination.

This exhibit was very interesting and instructive, and demonstrated the fact that in future when speaking of illumination the general term of "Foot-Candles" will be used.

And at night came the banquet. There were good Southern dishes and much singing of "Dixie" and "Maryland, My Maryland." Judge William H. Wadhams, Court of General Sessions, New York, was the principal speaker, followed by Mr. Edward H. Ford, humorist, who said lots of really funny things and referred to his namesake Henry, as a manufacturer of knick-knacks.

Saturday—more Southern hospitality. The Washington, D. C., association invited everybody to lunch; and every Canadian accepted. Leaving on the noon train the visitors reached Washington 1.15, and after a delightful luncheon, rubber neck-waggoned about our neighbor's beautiful capital city.

Sell Electrical Appliances as They Do Postage Stamps

The manager of a large central station company has just written us regarding the retailing of electrical appliances through hardware and drug stores. It is typical of many such expressions of opinion which one hears on all sides. This manager writes:

> **"It is a crying shame the way wholesalers, distributors, etc., sell electrical goods to hardware shops, plumbing shops, tinsmiths and others not in the electrical business—even to consumers—at the same discounts given to bonafide electrical shops. These people then sell these goods as a side line at practically nothing above cost, as a drug store sells postage stamps, simply to attract the public. This results in the public getting the impression that the electrical shops are charging exhorbitant prices. Furthermore, the hardware men and others frequently have below-standard goods foisted on them, whose poor quality eventually does an injury to the electrical business as a whole. What is needed is co-operation between representatives of all electrical men, from the manufacturers down to the retailers."**

Duty Based on Gold Value of Currency

The Department of Customs has issued a memorandum regarding the valuation of currency of invoices. In respect to importation from any country, whose business is carried on in a paper currency which is depreciated in relation to the standard coins of currency of such country, whether gold or silver, this depreciation may be allowed for duty purposes. This means, for instance, that goods entering Canada from England would be valued for dutiable purposes, according to the value of the pound sterling in Canadian money. We understand this ruling does not, as reported in the daily press, apply to imports from the United States.

Next!

Following the challenge announced in a recent issue of the Electrical News by Mr. A. B. Cooper of the Canadian General Electric Co., and Mr. A. S. McCordick of the Moloney Electric Company of Canada for a game to decide the golf championship of the electrical industry in and around Toronto, a contest was staged October 24th between the above-named gentlemen and Mr. W. P. Dobson and Mr. Mulholland of the Strachan Avenue laboratories of the Hydro-electric Power Commission of Ontario. The game was played at the Weston Golf Club and resulted in the defeat of the challengers.

Mr. N. McLeod, 690 Danforth Ave., Toronto, has been awarded the contract for electrical work on $7,000 residence being built on Bingham Ave., by Mr. A. W. Chamberlin.

Toronto Contractors and Dealers Have a Demonstration on the best Methods in

Retail Electrical Merchandising

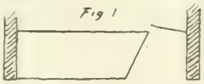
Three Distinct Functions: Buying, Selling and Co-ordination—Danger Signals Outlined—Use Show Cards and Make Your Window Pay Your Rent

Retail Electrical Merchandising formed the subject of an address given by Mr. Corcoran of Schnectady, N.Y., before a recent gathering of the Toronto branch of the Ontario Association of Electrical Contractors and Dealers. Mr. Corcoran began his discourse by pointing out that the subject of electrical merchandising was one for the manufacturers and jobbers as well as the dealers. "All three must combine their efforts to put the idea of electrical merchandising across to the public," he said. "Electrical goods are neither luxuries nor necessities; they are conveniences. The discount that the retailer gets is for the service he performs. It is not enough that he merely fill orders; he, with the aid of the manufacturer and jobber, must sell the convenience idea to the public."

"It seems to me there are three distinct functions in electrical merchandising, namely, buying, selling and co-ordination. We are principally interested, in this discussion, with the last two. What are some of the main features under the heading of selling? First, there is the store itself. The fundamentals in choosing a store are location and equipment. Second, there is the stock, the fundamentals of which are comprehensiveness and quality. Third, there is the question of service.

Service.

"There are two kinds of service: ordinary service, and special service. Ordinary service is simply taking the order, wrapping up the goods and taking the money. That's an order taker. Special service is composed of two kinds, namely, static and dynamic. Static service means the keeping of the customer's good will. For example, keeping a parcel for a customer until she calls for it is static service.



This was said to be a poor layout even for a narrow store

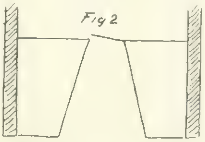
Then there is dynamic service, and let me say right here that dynamic service is the fundamental of retail electrical merchandising. The dynamic salesman must understand window display, interior layout, newspaper advertising, and must know his prices."

Co-ordination.

"The third function in electrical merchandising is that of co-ordination, or the study of maintenance, measurement and management. By measurement we mean the turning of goods into dollars and cents and measuring them by means of the inventory. Management is observation, planning, originating, etc., which is in your mind. This brings us to the question of policy. Policy is simply the laying down of certain fixed rules or principles for the guidance of the business. These rules should incorporate the following: change advertising often; make it mean something; make each sale a top-notch sale, keep faith with customers, go out of your way to deal squarely.

Danger Signals.

"Now in retail electrical merchandising there are certain danger signals which should be observed by every successful dealer, and among them are the following: slow turnovers; too much credit; difficulty in obtaining bank accommodations; dissatisfied customers; loss of customers; accumulation of obsolete stock; no new customers; too many bad debts, and business that goes to competitors. These are matters which demand constant watchfulness on the part of the dealer. Now, at this point I would like to call your attention to a matter that is not receiving the attention from the dealer that its importance deserves. I mean the retail clerk. The contractor-dealer is deficient in selecting proper sales persons. He is a technical man and neglects the subject of merchandising, but he can ill-afford to do so. It is of the greatest importance to the manufacturer, jobber and retailer that the sales personnel of the latter be top-notch. The dealer should try to get a young man or woman whom he can train in the business. Don't put an advertisement in the papers and think you will get the right one in the first person that calls. The qualities required in a retail clerk are economy, courtesy, energy, loyalty, honesty and intelligence, coupled with a practical mind. The salesman should always know his stock, know where to find it, know its talking points, know his prices, and understand salesmanship. Some of the examples of salesmanship to be found in electrical stores are anything but flattering to the business. Dealers could well afford to take a lesson from the clerks in the clothing and departmental stores. These people make a study of salesmanship; they train their clerks in the business.



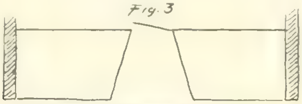
A vast improvement over the plan in Fig 1

Advertising.

"Then we come to the question of advertising. Newspaper advertising is good, but direct mail advertising is better. There is nothing equal to a well-planned, well-executed direct mail advertising campaign. It must of course be systematic above all things, and the letters must be worded to suit the needs of those receiving them; anything won't do. The main feature in advertising is to have something unique, something different, even to the extent of making a character of yourself, if you think it advisable. In this connection I wou'd like to say a word about delivery vans. If you have a delivery van don't merely paint it up and then let it run around until the paint is all worn off, and it begins to look shabby. [illegible] bearing your name. In this way the sign can be removed frequently and freshened up, or a new one put in. In advertising, take into consideration current events, national holidays, local events, weather prospects, etc. Then there is the question of the personality of the owner. The dealer should be an outstanding figure in his community. He should identify himself with the public interests. He should maintain his membership in local organizations—for example his local electrical association. Briefly, he must be a good mixer.

"Electrical merchandising is in its infancy. Fundamentals must be worked out, and it is only by getting together that this can be made possible. For example, what population will support an electrical store? How will it decrease after dynamic merchandising is applied? There is a limit to electrical merchandising. Those in it must work it to the best advantage, and to do this the dealer must have statistics upon which to base his conclusions, just as the insurance actuaries understand the fundamentals of insurance risks. A fine example of this is given us by the United Cigar Stores who have it figured out that every rainy day in New York city costs them $4,000 in loss of business.

Fig. 3



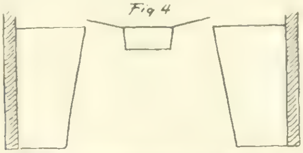
The usual arrangement with a fairly wide window

"Reverting to the question of co-ordination: it is a fact that too much stress cannot be laid on the feature of store arrangement, and this includes location. The location means a great deal. There is no fixed rule that can be given as a guide in selecting a location. The dealer must be guided by the circumstances peculiar to his own case. If the store is on the 'trade stream' you pay for location, and consequently you must make your store work for you. Your rent includes both space and location. Perhaps you can get near a moving picture house, or a departmental store, where your window will become fixed in the minds of the people who frequent these places.

Be Distinctive.

"Study to be distinctive. We always know a United Cigar Store because it is red. If you happen to have a second storey window enlarge it; make it wide and attractive; make it work for you. Again, have no impediments to the entrance or in front of your window. In winter keep the snow cleared away. If the other fellow doesn't keep his cleared, it will make your's all the more distinctive or unique. Avoid trap doors or gratings in front of your window. In [illegible]

Fig 4



Ideal arrangement with wide store, allowing showcase between double entrance

Color Schemes.

"The dealer must be a color artist. He must understand the meaning of color tones in dressing his window. Statistics drawn from a wide field would seem to prove conclusively that a general scheme of a light gray color is the best setting [illegible] velvets, or mahogany backgrounds. They reflect the light too much and detract from the appearance of the goods. Beaverboard in light gray, with panelling of a darker shade makes a pleasing background. Put a valance on your window, and have good lighting, but have it concealed. Light should be felt, not seen. Close your window off at the back. In this way people won't see through to your store, and clerks will not be tempted to hang over the rail and look out.

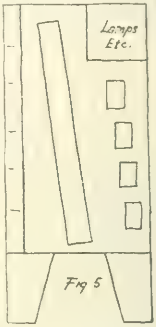


Fig 5

A carpet runner suggests moving on to the back of the store

Use Showcards.

"Don't forget to use showcards. It is astonishing the number of dealers who don't use showcards. It is not enough to put the goods in the window, you must make the display "talk" by using showcards. Put prices on everything in your window. The psychological reaction is that the goods must be good value at the money. Furthermore, the passerby will know whether or not the article is within reach of his pocket book.

Value Your Store Space.

"An electrical expert has given us the following table as representing the proportionate value of an electrical store. Entrance, 16½ per cent., window 30 per cent., right side of store 27½ per cent., left side 26 per cent., front half of store 33½ per cent., rear half 20 per cent. It will be seen from these figures that window space is worth only 3½ per cent. less than the whole front half of the store." At this point the speaker produced some charts showing various types of store fronts, some of which are reproduced here in rough sketches.

"There are many different types of windows used by dealers, but the best is that with two windows, with an entrance in the centre large enough to accommodate a showcase for displaying the leading lines. A long window with an entrance at the side is not nearly so good. In the case of a narrow front with a deep store, the dealer should plan to extend his window back into the store. If the store is on a corner, by all means have a window facing on both streets. Make your entrance inviting. A good idea is to have a carpet runner extending from the front door to the rear of the store.

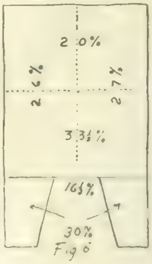


Fig 6

Showing the relative values of the various parts of your store

A dark room can be used at the rear of the store to display different kinds of lighting sets, or boxes may be used for showing off individual lighting units, in this way eliminating the undesirable forest of lighting fixtures so prevalent in retail electrical stores. If possible, avoid steps up to your store. It is much more inviting to step into a store than 'up' to a store.

Only Two Kinds of Stores.

"There are only two kinds of stores that the electrical dealer should keep before him as types of what he should and should not do, and these are the jewelry and hardware types. By the jewelry type I mean elaborate showcases, fine trimmings, palms, etc. Keep away from this type, unless you are catering to a very high class trade. It gives the impression of high prices and exclusiveness, which the average dealer does not want. The hardware type makes the best paying electrical store. In other words, put your goods where the people can handle them. Of course, it is necessary to keep some things under glass, but as much as possible put appliances where the people can handle them. The people like it.

Interior Decoration.

"For interior decoration the colors should be lighter the higher up they go. The ceiling should be a lighter tint than other parts of the store. A light tan or cream color, or gray with blue trimming makes an ideal setting for an interior. If you have any pillars or posts in your store a good idea is to build a seat around them, and put a shelf above for small appliances. If you have a display table, have plenty of outlets; six or more on each side of the table. Keep the top of your showcases tidy. Don't leave showcards on them until they get dusty and frayed at the edges, or until the goods they advertise have long since been sold out. Place related articles near each other, and aim at the convenience of your customers. And let me repeat, use soft colors and tones; it is one of the greatest aids to successful merchandising."

"Non-Twist" in New Quarters

The Non-Twist Canopy Ring of Canada, Ltd., announces the removal of both their factory and office to the Wilcox Building at 34 St. Patrick St., Toronto. This measns that the factory at 424 Adelaide Street West and the office at 58 Temperance Street will both be closed and the entire business of the company carried on at the new address where they occupy the whole second floor of this five storey building. Mr. F. D. Parmenter, general manager of the company, announces that they have just made arrangements with Donner & Green, 34 Aikins Building, Winnipeg, to act as their agents. All business from Fort William west to the coast will be handled from this Winnipeg office.

Mr. Morden Goes to Coffield Washer Co.

Mr. Harley W. Morden, who has been sales manager for the Canadian Drill and Electric Box Company during the past half dozen years, has resigned to accept the appointment as sales manager for the Canadian Coffield Washer Co., Ltd., who are building a plant at Hamilton for the manufacture of this machine. The factory is expected to be in operation in about two months, and in the meantime ample stocks are being carried by Bloom and Brittain, James Street, Hamilton, who are the present distributors for Canada.

The Harvey Hubbell Co. of Canada have issued an attractive folder drawing attention to their electrical specialties, and more particularly, Hubbell reflectors for industrial illumination. The Harvey Hubbell Company of Canada manufacture a complete line of reflectors, plugs, sockets, lampguards, switches, and other electrical equipment.

Effects of Impurities of Various Kinds on a Storage Battery

By F. K. Dalton

In view of the fact that the owners of storage batteries are most carefully warned that they should add to the electrolyte only the purest water, the following statements regarding the effects of foreign matter which may be contained in other than distilled water, will, no doubt, be of interest to many of our readers. The lead-cell alone is here considered:

The effects of impurities in the electrolyte are, generally, to corrode and, eventually, disintegrate the plates, to fill up the pores and decrease their capacity, or to cause local action by deposition on the plates and producing, with the active material on which it may be deposited, a couple which causes local action.

If the impurities are lead-attacking acids, or their salts, the rapidity of shedding of the positive active material is increased, and in Plante plates the underlying base lead is more rapidly attacked.

Metallic impurities act as oxygen carriers from anode to cathode and thus cause a transfer of charge, which results in gradual internal discharge of both electrodes.

Platinum.—The smallest trace will cause discharge of the negative electrodes.

Hydrochloric Acid—acts on the positive electrodes to form lead chloride from the peroxide—this later changes into lead sulphate, which is accompanied by an internal discharge of the positive electrode: The HCl is again released and the local action continues. Such action does not usually last for more than a month since the evolution of chlorine gas, due to electrolytic action gradually weakens the HCl.

Arsenic—This non-metal discharges the negative electrode, but does not affect the positive electrode. Its duration in a cell is short, however, as it gradually disappears, partly as an arsenate of hydrogen and partly in its elementary state falling to the bottom of the cell.

Nitric Acid.—This is harmful to both electrodes. It will corrode and disintegrate the positive electrode though not discharging it. It forms nitrate of lead with the negative electrode, this later being converted into lead sulphate which change is accompanied by the release of nitric acid. This released acid will again attack the sponge lead. The presence of nitric acid and metallic impurities causes the electrolyte to become much warmer on charge than normally. This increase has been known to become so great as to crack glass containers.

Ammonia—reduces the capacity of the electrodes. It also causes "creeping" of the electrolyte over the edges of cells by forming crystals of ammonium sulphate around the edges of the cell, and the electrolyte by capillary attraction is led over the tops of the cells. Batteries should not be installed near stables, ammonia refrigeration plants, or chemical works.

Iron.—Most injurious of all substances which are likely to appear in a cell. It discharges both electrodes and, unlike other impurities, is not eliminated with time, but is permanent. It acts as an oxygen carrier. It is estimated that 0.5 per cent. of iron in electrolyte will completely discharge a cell in 20 days.

Manganese.—Salts of this element act in the same manner as iron salts, carrying oxygen. Permanganic acid and manganic sulphate are formed. A red, or reddish violet coloration of the electrolyte indicates the presence of man-[illegible]

Antimony—causes local action which discharges the negative electrode on which this deposit of antimony collects. This element is particularly deleterious in the case of cells which stand idle.

Two metals of nearly any kind produce local action and have an injurious effect.

Vimy Supply Company Make Fine Wireless Display

The window illustrated here is that of the Vimy Supply Company, 567 College Street, Toronto, the leading spirit of which is Mr. J. W. Askham. Mr. Askham, or rather, Captain Askham, belongs to the army of Anzacs who found themselves in France at the beginning of the late war, and owing to his knowledge of electricity and wireless apparatus became attached to the Royal Air Force with which branch he served until the early part of 1917 when he was released from active service to return to Canada where he had full charge of the Canadian Wireless Instruction Department of the Royal Air Force. Later, when America entered the struggle he was transferred to Texas to assist in training recruits for the American Flying Corps.

After being demobilized, Capt. Askham became imbued with the idea of establishing an electrical and wireless supply depot for commercial purposes, and which would also become a service supply station for amateur wireless enthusiasts. It is just eighteen months since Mr. Askham put this idea into practice by opening his store at 567 College Street, and the results to date have fully justified his belief in the need for such service. In that short time the company has worked up a clientele, both commercial and amateur, of a wide and varied character, extending to Australia, New Zealand, and the farthest outposts of the British Empire.

"Wireless" Window that attracts much attention

At the commencement of its career the company found it necessary to import a large amount of its apparatus from the United States, but arrangements have been made to manufacture more in Canada, thus eliminating, as Mr. Askham points out, the import duty and loss due to exchange, on imported goods, and cutting down the cost to the consumer.

The Vimy company have opened a small plant for the manufacture of certain parts such as rheostats, valve controls, panels, small receiving sets, etc., used by the amateur in making up his own set, as well as various electric specialties such as the electric soldering iron which was described in these columns. The wireless outfit shown in the picture was set up by an amateur from parts manufactured by this company. Mr. Askham studies to give service to his patrons, and in his window neatly printed cards are to be seen with invitations like the following: "Here are a few samples of parts. If you don't see what you want, just come in and ask." A large stock is carried, and the company will promptly forward complete lists of their products on request.

Colors in Your Window Display

Both the color of the window finish and the goods displayed must be considered in determining the intensity of the illumination. Disregard of these features has caused many a display to appear dull and uninteresting in tone. It is best to have the wiring arranged so that some of the lamps can be turned off or on, as results indicate.

The following table shows the percentage of light reflected by different colored surfaces, and will assist in determining how many lamps to use in window displays.

Dark Blue	6½%
Dark Green	10 %
Pale Red	16 %
Dark Yellow	20 %
Pale Blue	30 %
Pale Yellow	40 %
Pale Green	46½%
Pale Orange	55 %
White	70 %

It costs more to light a window finished in dark wood, such as mahogany, than one finished in light oak. This is also true of draperies, and the color of the goods displayed.

In displaying nickel ware, care should be taken not to have too much light, as the high intensity brings out the reflections on the polished surfaces too forcefully; this is confusing to the eye of the observer. Study each arrangement and adjust the light till you get a beautiful soft tone on the entire display.

Do not neglect to keep the window illuminated during the evening. Hundreds, who in the hustle and bustle of business have little time during the day, will stop at an attractive window in the evening hours and often see something which prompts a profitable visit to the store the next day. Use a time switch to cut off the lights after midnight, but don't darken your windows during the earlier evening hours.

An electrically-driven valve grinder, with attachment for grinding a reseating tool, which is known as the Portable Repair Shop Unit, has recently been introduced to the automobile trade by the Franklin Machine Tool Company of Springfield, Ohio. There are three units to the machine, the ¼ h.p. Westinghouse driving motor, the grindstone and the valve which also has an attachment for holding the reseating tool. Both the grindstone and valve holder are attached by belt drives to the motor, the latter having its speed reduced through a worm gear so that both turn against each other—the valve lip and the stone—making it possible to grind a valve in 14 seconds. The valve holder may be set at any angle to the stone in order that the valve may get the proper 45 degrees set. Also, the reseating tool may be ground at exactly the same angle as the valve in order to make a quick and gasoline-tight fit. This tool is attached and operated through a flexible driving shaft allowing the cylinder to be reseated without taking it from the machine. The whole machine weighs 72 pounds, being ideally suited for repair shops especially as it is operated from an electric light socket

"The Best Paper Read in Years." A Successful Electrical Contractor Outlines the Proper Policies and Ideals in

Managing a Contracting Business

It Was Arthur L. Abbott of the Electrical Construction Company, St. Paul, Before the Baltimore Convention of Electrical Contractors and Dealers which was Attended by Several Canadians

There are two methods which might be followed in discussing this subject. The one which perhaps would seem the most natural is to analyze and classify all operations involved in carrying on an electrical contracting business, then to take up each subdivision by itself and attempt to cover it fully. I have made such a classification of the activities of a business, and find that they can be quite completely covered under about twenty-six subdivisions, and I estimate that at least twelve hours would be required to discuss all items with anything approaching completeness. This might possibly be termed an exhaustive treatment.

The other method which I have adopted as decidedly more practicable for a talk of this nature, is to outline certain principles which have a general application, to discuss the application of these principles to the electrical contracting business in particular, and to give some examples showing how the principles can be applied. It should be clearly understood that the examples cited are intended merely as illustrations and include only a few of the many possible applications.

The underlying principles of management have been more or less fully discussed by various writers on this subject. I have chosen, as best adapted to our present purpose, the statement of fundamentals laid down by Mr. Harrington Emerson, which he has named "The Thirteen Principles of Efficiency." A careful consideration of these principles will, I believe, show that they are truly fundamental and complete. It therefore must follow that to the extent that they are applied in the management of a business, the business will be successful; and to the extent that they are neglected, the business will be a failure.

Ideals

In order to arrive anywhere it is first necessary that we have an objective point. The great aim of every contractor is presumed to be business success. In the final analysis, the measure of success in business is not profit; however, for a given volume and class of business, overhead is, or should be, almost a fixed amount, therefore we may say that the major ideal of the contractor is a certain annual volume at a fair gross profit. The contractor who is just drifting along, who prefers to take things as they come rather than to make any special effort, will vaguely hope that his next year's volume may be equal to this year's or perhaps slightly larger. The good business man will carefully examine his records for several previous years, will take into account general business conditions and the ability of his organization to get new business and to handle work after it is secured, and will finally arrive at a definite figure for new business to be secured which becomes his major ideal for that year. He will even go further than this, and fix a tentative figure for his annual volume of business at some more distant time, say, five years ahead. The only limit to your volume is the market in your territory, and even the market can be improved to some extent through your own efforts. There is more danger that you will fix your ideal too low than too high. Set a mark to shoot at for each year's volume and per cent. of gross profit, and then move heaven and earth to reach that mark—and be sure you set the mark high enough.

A number of minor ideals are involved in the major ideal of success. Among these none is of more importance than the ideal of service. I offer this definition of the term: Service is furnishing to your customer the thing that he ought to have. Service is not a state of mind, not something existing only in the imagination, but in a sense it is a commodity which you keep in stock and which costs real money. The more diversified the service the greater the expense of maintaining the necessary organization, hence the small contractor had best specialize and not attempt to cover too much ground. It is worth while to make a full statement of your ideal of service; write it out in detail, then see how far you fall short of the ideal and determine what steps should be taken to remedy the deficiencies.

Some other minor ideals are the development of the morals of the organization—the spirit of loyalty and enthusiastic interest in the game; the contractor's ideal of policy in adjusting claims and misunderstandings with customers; the ideal of the right kind of co-operation with your competitors to improve trade conditions; and the ideal of developing a perfect business machine—the mental attitude that keeps you forever on the lookout for defects, large or small, and never satisfied until you have found the remedy for every one discovered.

Plans

Having established definite ideals, it is necessary in order that we may attain these ideals, that we plan to do so. A successful business is not operated on the hit or miss basis. If the business is to have a healthy growth, if it is to expand consistently along the lines that insure increased profits, we must have definite, carefully thought out plans for conducting the business. Such plans must cover these points:—

a. An estimate of the volume of business to be expected during the year.

b. Determination of the classes of business on which sales effort should be concentrated.

c. Determination of the territory to be covered.

d. Preparation of a budget of expense.

e. Making provision for the capital required to carry on the business.

f. A complete and definite organization plan, covering [illegible] performed by each individual.

g. Laying out an adequate phpsical plant — office, storeroom, furniture, office equipment, etc.

If capital could be had for the asking; if trained men ready to fit into your plan could be picked up at a moment's notice; if you could move every thirty days into a new office, fully equipped and exactly suited to your needs at that particular time; then planning your business would be a very simple matter. Unfortunately, however, an electrical contracting organization is not so elastic that it automatically fits itself to any volume of business. Sudden expansion in volume usually means congestion and lowered efficiency; sudden contraction in volume means excessive overhead. The business which is operating without careful planning is usually operating at one or the other of these two extremes—either everybody is swamped, service becomes a minus quantity, material is not ordered properly, the work is not properly supervised, billing is a month late—or the organization is "eating its head off" for lack of something to do. One of the most difficult problems in managing an electrical contracting business is to preserve the proper balance between the organization and the quantity of work in progress; and it is only by means of careful planning that such a balance can be maintained.

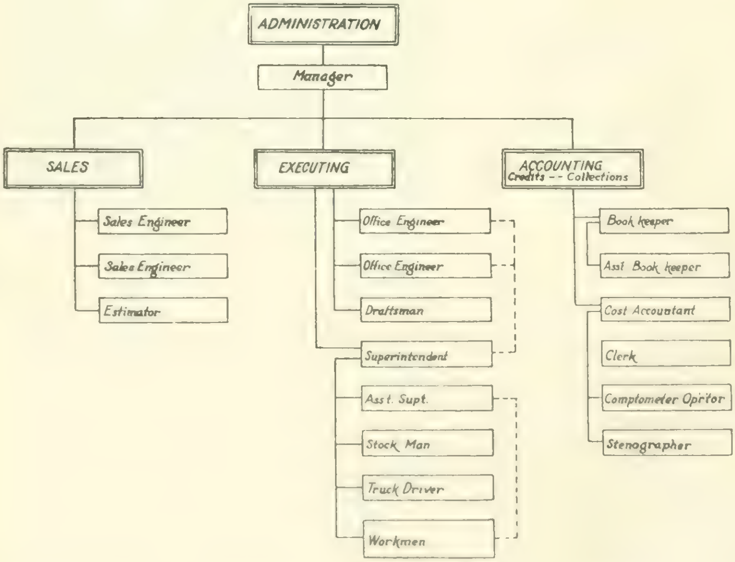
The matter of choosing the personnel of your organization is all important. The kind of service your customer gets is entirely dependent upon your organization. An organization diagram must be drawn up showing the place and function of each individual. For the purpose of preparing such a diagram, the activities of your business may well be analyzed under the heads of Administration, Sales, Executing and Accounting. A typical diagram for a business of medium size is shown herewith. Bear in mind that certain functions must be performed in any business, regardless of its size. Thus where one business has an organization of ten people, another may have only two, but these two must perform as many different functions as the ten, if the business is to be handled efficiently.

Records

In the attempt to plan the business the absolute necessity of records will become evident. Without the right kind of records all plans must be based upon guesses instead of upon facts.

Mr. Emerson says that records must be immediate, adequate, permanent and reliable. It is well to critically examine all records kept in your office to satisfy yourself that they fulfil these four requirements. It goes without saying that every record has a certain cost and a certain value; if the value is less than the cost the record should be changed or dispensed with. A common example of a faulty record is an estimate made on any convenient blank sheet of paper, and showing only a part of the process of arriving at the final figures. This is far from being a permanent record, and its cost will eventually be double that of a complete systematic estimate made on suitable forms. Another example is labor cost data, as it has ordinarily been recorded by electrical contractors, which has been in the form of records neither adequate nor reliable, and hence of little permanent value.

The necessity of keeping certain records is so well understood by contractors that they are in almost universal use. There are other records of great value which are not so common. Every contractor who makes any pretense of being a business man keeps cost records, but these records are not always properly summarized. A monthly recapitulation should be made, showing total cost and gross profit for work completed during the month, and the monthly costs and billing on uncompleted work. An itemized statement of expense should be drawn off, and a general report made up giving the vital statistics of the business. Such a report may cover the following items: New business secured by each sales engineer for the month and for the current year



Typical organization diagram for a business of medium size to date; amount of completed business credited to each sales engineer and per cent. of gross profit made; total labor costs and total material costs for the month, for the year, and for the last twelve months to date; overhead computed as a per cent. on a calculated volume arrived at by adding together for a given period the labor cost, material cost and an estimated gross profit. This latter figure should also be computed monthly for the current month, for the current year, and for the last twelve months to date. It furnishes an exceedingly valuable index to the real activity of the business, as well as a running check on overhead.

These records must be immediate, i.e., they must be made up promptly or they lose much of their value.

Scheduling and Dispatching

Scheduling and dispatching in factory practice refer to definite routine operations, very necessary and important steps in the process of executing an order. A schedule is the record of a plan, a listing of various operations to be performed in the execution of an order, showing the sequence of operations, and time alloted to each. The term "dispatching" refers to any means taken to insure the actual carrying out of plans and schedules. Scheduling and dispatching are not definite routine operations in business management as in factory practice, but are fully as necessary and important. Under scheduling we will include any operation of putting a plan in definite and concrete form with definite times allowed for carrying out the various portions of the plan. The plan of organization shown by the diagram, when accompanied by a list of individuals selected to fill the positions indicated, and when the time is specified at which each individual is to begin his duties, becomes a schedule. When the manager has employed the men, has assigned to each man his duties and thus has started the machine going on schedule time, his scheduled operations have been properly dispatched.

At first sight it may not be evident why these two principles should be considered equally as important as the other eleven. The reason is found in that ancient enemy of efficiency and progress, procrastination. Many a good business plan, many a bright idea, has passed away and been forgotten, simply because it was never put in definite form and carried out.

Scheduling may well be applied to some of the routine work in the office. In one office it has been found of great value to prepare on a special form a schedule of each job of any considerable importance. This schedule first shows the anticipated rate of progress and date of completion of the building; next the corresponding rate of progress on the electrical work; and finally the dates on which the principal classes of material will be needed and on which any office engineering work should be completed. Having the schedule prepared, the engineer in charge of a dozen jobs is enabled to dispatch his work so as to insure the delivery of materials and the furnishing of required data to the foreman at the proper time.

Standardized Conditions

The next principle claiming our attention is that of Standardized Conditions. In this expression the term "standardized" is intended to mean not merely that which conforms to a standard, but that which is brought up to the highest standard. In considering the conditions under which a man works his physical surroundings come first. These in turn have a very decided influence on his mental condition.

It is a fundamental and perfectly obvious principle in managing labor, though one often neglected, that the workman must be given an opportunity to do his best—that it is unreasonable and even absurd to expect the best results from a man when he is working under conditions that make the best work impossible. This is coming to be well understood in factory practice, so that we find the progressive factory manager going to extremes, taking infinite pains to provide ideal working conditions for the mechanic. The mechanic's product is easily measured and recorded as to quantity and quality, therefore the results of standardized conditions are in his case easily translated into dollars and cents. If it were possible to apply equivalent methods of measuring and grading the product of the brain worker, surprising possibilities of reducing overhead and improving service would be shown.

All details of the office and its equipment must be given careful study; space, arrangement, heating, ventilation, lighting, janitor service, desks, tables, chairs, filing equipment, storage for supplies, appliances, and many other items. There is a double reason for bringing the lighting in your office up to a standard of first-class office illumination—it is actually economical to do so, and at the same you advertise your technical ability and good sense.

The extreme importance of standardizing the working conditions in the office is no doubt well understood by many contractors, but certainly not by all. The beginner in the business with a very small organization can often overcome the handicap of poor working conditions by the force of his personality. As the size of the organization increases, more and more work and authority must be delegated, making it increasingly difficult to maintain high standards of work under bad conditions.

Office engineers and estimators in a contracting business do a great deal of work in connection with large building plans. At the same time, catalogues, correspondence and data files, note-books and curve sheets are in use and must be spread out for convenient reference. In one office, conditions are standardized for maximum efficiency in this class of work by providing each man with a regulation flat top desk and a 3 ft. x 5 ft. table of special design, having a number of very carefully thought out features, with a swivel chair placed between the desk and the table.

The sum total of standardized conditions is expressed in the atmosphere of the office. There is no satisfaction like that of achievement; put this satisfaction within a man's reach by surrounding him with conditions that make achievement possible. It is almost impossible to stop an organization that is working in an atmosphere of efficiency and success.

Standardized Operations

In the same way that it is necessary to provide the proper equipment, appliances, and other conditions, it is also necessary to standardize the method of doing the work. There is but one best way to do anything; that way must be found, and that thing done only in that way In most offices there is little difficulty in having the established routine followed, for this is the line of least resistance, but a great deal of inertia must be overcome before any effort is made to seek out and apply the one best method. In spite of this traditional progressiveness, the average American business man is very much attached to his own little rut and very much prejudiced in favor of continuing the old method, for the sole reason that the thing has always been done that way. Most of our operations are standardized in the sense that they are fixed—a certain thing is, in most cases, always done in the same way—but the method is often one that we have drifted into the habit of using and is not the result of careful study and investigation to find the one best way.

The principle of standardizing operations should be applied to all routine clerical work, to engineering work, and to estimating. By standardizing the operation of writing specifications, it has been found possible to greatly improve [illegible] in the specifications as to arrangement and wording, there is practically no chance that important items will be omitted, and the time required to prepare a specification is greatly reduced.

There is no good reason why all estimates made in one office should not be made in accordance with a standardized method. If properly recorded, the estimates will then be perfectly intelligible to any estimator in that office and can be easily checked. This applies particularly to pricing labor. It is entirely practicable to arrive at labor costs by a fixed method of calculation based upon tabulated data.

Written Standard Practice Instructions

Having expended some time and money in an investigation to determine the best way of doing things, we must, in order to preserve the results of our efforts, set them down in the form of written instruction sheets or other permanent records. All office routine should preferably be reduced to writing, forming a complete code of practice which is revised as may be necessary and always kept up-to-date. Such a code is indispensable in large concerns and would be of some advantage to any contractor, but is not so necessary where the entire office routine is handled by only a few people.

Every electrical contractor is continually working out new methods of doing things, new construction details, new schemes for shortening office operations. All such improvements should be made permanent assets of the concern by means of some form of records which are kept convenient for reference. The new ideas that work out well in practice become the standard practice of the company, and the records become standard practice instruction sheets. For example, an instruction sheet for draftsmen covering sizes of drawings, border lines, titles, symbols, etc., insures uniformity in drawings and saves much time. A special loose-leaf binder holding sheets 13 in. x 20 in., has been found very useful as a means of keeping convenient for reference all drawings of construction details that have permanent value as standards.

The Minnesota Labor Cost Data Committee have prepared a set of written standard practice sheets covering in detail all operations in making an estimate. These sheets serve several purposes. The small contractor whose business is gradually expanding is enabled to follow the best practice in estimating, makes more accurate estimates and thereby becomes better competition. In some of the larger offices, it frequently becomes necessary to teach a new man how to estimate work. By the use of the written instruction sheets, this can be done with the minimum expenditure of time by the instructor, and the beginner learns all the best methods, and none that are not the best.

Discipline

Discipline is a necessity in every organization. However, in a small organization, discipline is not a matter of time recorders, rules, and penalties. Rules there must be, but an enthusiastic interest in the work in hand is far more potent in enforcing rules than are any penalties. There always is, of course, the penalty of discharge, but this is a penalty for lack of ability or lack of a desire to accomplish, rather than for the infraction of set rules. The most rigid self-discipline must be practised by the men at the top; the force of his example is all-powerful and all-pervasive. Standardized conditions are a large factor in the maintenance of discipline. A well-arranged, well-equipped, well-lighted, well-ventilated, comfortable and clean office exerts a powerful influence on the office force to hold them to keeping regular hours, to prevent loafing on the job, and to make them orderly and systematic in their work.

Some employers follow a close-mouthed policy of keeping their office employees in complete ignorance, as far as possible, of everything pertaining to the condition of the business This is a great mistake. Take a man into your confidence and if he is a man of the right mental caliber he will respect that confidence. If you are having a tight pull financially, tell your men at least something about conditions and they will redouble their efforts to pull you out of the hole. If business is good and things are coming your way, be sure that your whole organization knows it—don't miss the opportunity to instill a little more of that elixir of life, the spirit of success.

The Fair Deal

The business organization of any kind which does not make the principle of the fair deal the basis of all their dealings with themselves, their employees, their customers and their competitors, is to-day a back number. Without a fair deal to employees there can be no loyalty to the employer, none of that spirit pervading the whole organization that is so strong a factor in attaining success. The customer expects and demands a fair deal from the contractor and will have nothing to do with the house where he does not get it. The predatory type of contractor may make money on one job by "putting it over" on his customer, but he rarely if ever gets a second chance with the same man.

The whole idea of co-operation upon which this association is based, rests upon the principle of the fair deal between competitors.

Competent Counsel

It may be quite positively stated that no man knows all there is to be known about his own business. The world is moving rapidly to-day along the line of development of business methods. It is a matter of necessity to the contractor who has the ambition to be a real success in business that somewhere and somehow he obtain expert advice, reliable data, up-to-date information on methods of applying fundamental business principles. Large business houses very commonly employ specialties, either as permanent members of the staff or in a consulting capacity, to conduct research work on their special problems. The prices these men command place them beyond the reach of most electrical contractors, so that it is a serious problem indeed for the contractor who would be progressive to obtain the necessary competent counsel. There are a considerable number of books which have some bearing on the subject; none that furnish the specific information wanted in concise form. The trade papers, including our own Contractor-Dealer, pay but scant attention to the essentials of the contracting business, but they should all be searched carefully for whatever of value they may contain.

Common Sense

Common sense is the summation of all the 13 principles—it comprehends them all and transcends them all. The other 12 principles are merely common sense analyzed and made specific and explicit. Common sense must be used in the application of the other 12, otherwise they cease to be principles of efficiency. Common sense is a personal attribute; most people have enough to get aong with if they would only use what they have. Mr. Emerson brings out the points that all people have some common sense, that common sense can be cultivated, and that the human mind works logically, but the greatest foe to efficiency and human progress is mental laziness.

Efficiency Reward

The cumulative net result of our efforts should be a greater net profit at the end of the year. If we have become more efficient, we are entitled to and can get a just reward.

A portion of this reward will come through the increased volume of business which naturally gravitates to the smoothly operating business machine, on account of the superior service rendered. Increased volume in itself operates to decrease overhead expense, and the same perfected machine that produces the high-grade service, will also reduce the total costs of work. Certain definite efforts must be made, however, in order to realize the full measure of the reward to which the efficient organization is entitled. Much can be accomplished by legitimate efforts through the local association to raise prices to a fair level; still greater results can be accomplished by properly directed sales efforts, in direct dealings with architects, engineers and owners. A reputation for fair dealing and for carrying the job through to successful completion without trouble or annoyance to anyone concerned, is by far the most effective selling argument the sales engineer can employ, and will often enable him to secure business without competition or at an increase over competitive prices. It is a psychological fact that the good salesman can and will sell the service of his house at higher price when he is himself completely sold on the idea that that service is of a superior brand.

In addition to securing a fair efficiency reward for the owners of the business, it is equally as important that an adequate efficiency reward should be received by all employees. Personally I am absolutely convinced that every individual in the organization should be paid a salary or wages plus a bonus; a few of the higher salaried men to receive a percentage of the net profits of the company at the end of the year, the balance of the office force and all workmen to receive a bonus based upon the quantity and quality of work they turn out. This is so far only a theory, but if this principle can be successfully carried out by the Bethlehem Steel Works, why cannot the same thing be done by an electrical contractor?

On account of time limitations a large branch of this subject has been left untouched, namely, all problems relating to the actual handling of construction work:—handling labor, organizing the job, installation methods, etc. It will be readily seen that the thirteen principles apply here as well as to the general management of the business. It has been my observation that the average contractor takes care of this part of his work better than the other end. However, there is room for a vast amount of improvement in the methods most of us employ in handling the work. It is gratifying to note the very excellent series of articles dealing with this phase of contracting in the current issues of the Contractor-Dealer. This has been a most valuable feature of the publication and should by all means be continued.

Summing up the argument: If you would succeed, first know what you want, then plan to get it. Base your plans upon records and keep records upon which future plans can be based. Having made your plans and having put them in definite form, carry them through on schedule time. Surround your organization with conditions that are an inspiration to the best work, employ the best methods in everything that is done, and make these methods definite and permanent. Keep your organization inspired with that love of the game that produces the highest type of team-work. Make the fair deal the underlying principle of your business. Realize that you don't know it all and that competent counsel must be and can be obtained. Measure all things by the standards of common sense; and finally, having done this, you have earned a reward; go and get it.

A Well Lighted Street

The illustration herewith shows one of the best lighted streets in the city of Toronto. Indeed, aside from the so-called White Way on King and Yonge Streets, which is recognized as being a somewhat extravagant waste of electric current, considering the results obtained, this may be said to be the most satisfactory arrangement yet tried out. The poles are placed about 100 feet apart and the light units are approximately 15 feet from the ground. In the original lighting of the Toronto system the lamps were placed considerably lower than this and were found to be very much confusing, particularly to the motorist, as they were too close to his line of vision. It is not entirely evident that these lamps might not be placed a little higher yet with advantage.

The glassware is the well-known "Moonstone" manufactured by the Jefferson Glass Company, Toronto, and the light unit is a 300 watt nitrogen. The illustration shows the unit by day, and a view of Danforth Ave. by night. Note the illumination of the main building to the right and the splendid and ample distribution all over this fine street. A similar system is in operation on St. Clair Ave. West.

These lights are so arranged that one-half of them may be switched off as required. This is a valuable feature in view of the present power shortage and admits of the street being fairly well lighted at all times with the more brilliant illumination in the evening after the peak demand is past.

Splendid illumination on Danforth Ave., Toronto—Close-up view of unit shown on left

Big Diversity of Practice in Collecting Tax on Fixtures

There is, apparently, a considerable diversity of opinion regarding the computation of taxes on lighting fixtures. It is important that this matter should be cleared up, as no law can be enforced that is not understood, neither is it fair that certain manufacturers should be more heavily taxed than others simply because they interpret the law differently. The following letter has a very great interest for all fixture manufacturers, and we trust will be a step towards clearing the atmosphere.

Hamilton, Canada, Oct. 28, 1920.

Editor Electrical News:

Answering yours of Oct. 22nd regarding dissatisfaction over the workings of the Luxury Tax as relating to lighting fixtures, there has certainly been a very great difference in the method of determining the amount of tax by the various manufacturers. While the text of the act might appear quite clear to anyone casually reading same over, when you come to the actual application of it to the many types and styles of lighting fixtures it will be found susceptible to various interpretations.

Apparently a great many manufacturers have not considered it important enough to apply to the Department of Customs and Inland Revenue for definite rulings on doubtful points, but have followed their own interpretation of the act with the natural result that there is no uniformity of practice. As a consequence the jobber, dealer and contractor purchasing from different manufacturers who use different methods in computing the tax are at a loss to know which is and which is not the correct practice.

This has led to misunderstandings and has been a great hardship on manufacturers charging the tax in accordance with the rulings of the Department of Customs and Inland Revenue. Naturally a dealer buying an article from one manufacturer, and practically the same thing from another manufacturer, is going to feel dissatisfied with the first if his invoice carries a greater tax than the second. The chances are when he again wants similar goods the order is going to the second maker, provided other things are equal.

The writer knows from actual experience, because in the few months the act has been in force there has hardly been a day pass when complaints haven't been received to the effect that the tax charged on fixtures was too high, because other manufacturers either were not taxing that fixture at all or were operating on a different basis.

Aside from the fact of whether one does or does not feel that lighting fixtures are a legitimate commodity to tax, the Government have seen fit to include them and it is the duty of those concerned to bring their practice into conformity with the requirements of the act with all possible speed.

There are a few outstanding points about which considerable difference of opinion seems to prevail and which have led to most of the misunderstandings.

(1) There has been a misunderstanding as to what portion of the sale price of the fixture is to bear the 10 per cent. tax. The use of the word "excess" in the act has undoubtedly been largely the cause of this. Many have concluded that only the sale price over and above the exemption value is to be taxed. This is not correct, in so far as lighting fixtures are concerned. What the act actually states is, that certain classes of fixtures selling for a specified amount or under, are exempt, and not that such fixtures are exempted to the extent of the stated value. A careful reading of the text of the act will make this clear and it is confirmed by the pamphlet later issued under the heading "Excise Taxes, Alphabetical List of Articles Subject to Excise Taxes and List of Exemptions from Sales Tax," as well as independent rulings from the Department.

(2) Another point on which much confusion prevails is what kind of fixtures come under the class of "Chandeliers." The act states that "Chandeliers" are exempted to the extent of $12.00 each, which is the greatest exemption allowed on lighting fixtures. Now the term "Chandelier" is practically an obsolete one and very rarely used by the lighting fixture trade, so that the meaning conveyed by the use of it will depend very largely on the impression of the party addressed. The result is that many have taken it to mean that all fixtures suspended or supported from the ceiling come within the class of chandeliers so long as they are equipped with more than one light. But this conclusion does not agree with the rulings of the Department of Customs and Inland Revenue which has defined chandeliers as ceiling fixtures with two or more lights supported by separate arms or branches. As a consequence, while some manufacturers have been considering such fixtures commonly known as domes, semi-indirects, commercial lighting units, etc., as chandeliers and not charging tax on them unless sold for more than $12.00 each, the Department rules that these styles of fixtures are not "chandeliers" and come within the class subject to tax when sold in excess of $3.00 each.

(3) Again, another misunderstanding has arisen, which, (while it does not so directly concern regular manufacturers) should be cleared up. Many dealers have figured that by purchasing their fixtures in parts and by doing their own assembling the tax can be overcome. Fixture parts are not taxed and in purchasing this way no tax is added by the manufacturer. Semi-indirect fixtures lend themselves easily to this practice, as the glassware can be purchased independently from the supporting members. However, the Department has ruled that in such a case the party doing the assembling is considered a manufacturer and as such is responsible for collecting and making returns of the tax on his sales.

While the Department has been somewhat lenient to date in enforcing the act, due perhaps to an insufficient organization, we understand they intend being more strict from now on. The sales records of those concerned will undoubtedly be audited from time to time and those firms that have not charged sufficient tax obliged to make good the deficiency. The point will then arise, can the manufacturer bill his customer for the balance of tax, or who must stand the loss?

Yours truly,
Tallman Brass & Metal, Limited.
T. S. Turnbull, Fixture Dept.

A New Fixture Catalogue

McDonald & Willson, Ltd., Toronto, have just gotten out a little catalogue, No. 20, illustrating a number of lighting fixtures. The fixtures in the bulletin are all attractive in design and very moderately priced, and are such as should be very ready sellers with the electrical trade. With this catalogue in hand the dealer could readily take care of almost any requirements in fixtures—apart from elaborate equipment. Toward the back of the bulletin six or seven very good commercial pieces are shown. The company also feature their Duplex lighting unit on pages No. 28 and No. 29, of which they have made some very large and representative installations. The style of illustration used, the background of which is solid black, is quite effective and almost a new departure in fixture catalogue work in this country.

Good Salesmen do not Just "Happen"— Successful Retailers Make a Life Study of

How to Meet and Treat the Customer

Know your Product—Don't Disparage your Competitor's—Never Allow a Prospect to Leave you Without Feeling that he will Come Back

Time: Late afternoon.

Place. Entrace to a dealer's store.

Scene: Washing machine demonstration. Dealer standing nearby. Gentleman approaches, stops to look at the machine. For a while nothing is said. Finally:

"What is the price of this machine "

"One hundred and ninety dollars, sir," replied the dealer.

Again silence reigns.

"How much does it cost to run a machine like that?"

"Half a cent an hour, sir."

Again prolonged silence.

"How much clothing will it wash at once?"

"Ten sheets, sir, or fourteen pounds of dry clothes."

"I was looking at a B— machine yesterday, which I rather liked. It had a nicely finished exterior of enamel," said the gentleman.

"Oh, replied the dealer, "the B— machine has an enclosed motor which makes it difficult to oil.

"I thought the B— motor was self-lubricating."

"No, I don't think so. Anyway the motor on this machine is easy to get at," said the dealer, as he proceeded to open a little trap door at the back of the washer, showing easy access to the motor.

Silence again, while the enquirer walked around the machine. Finally two ladies approached and stopped to look at the machine, whereupon the gentleman withdrew and continued on down the street.

We leave the reader to form his own opinions about this conversation. For ourselves, we wonder the gentleman did not leave sooner. That he was interested goes without saying. That he was intelligent must be admitted by the questions he asked. That he was practical is revealed in his first question. All of this the dealer could have observed with a little thought, and adjusted his conversation accordingly. The very fact that the prospect did not leave after being told the price showed that he did not consider it beyond his reach. Considering the nature of the question the dealer might have been justified in concluding that the man was Scotch, but whether or not, the suggestion would not have been out of place that there were other machines on the market more expensive. The dealer should by all means have taken the offensive, and not waited for the prospect to "drag" the information out of him. Instead of waiting for the prospect to ask questions the dealer could have invited him to step inside and see one of the machines partly dismantled, so that the former might get some idea of the interior construction and workmanship. In this way the dealer could have opened up further avenues of conversation.

When the prospect mentioned that he had seen a machine the previous day that had appealed to him, the dealer should have immediately set out to turn the prospect's attention away from the B— machine to his own. In fact, the prospect gave him the very clue he needed, for he mentioned that the other machine had a nice enamel finished exterior. In replying, instead of disgressing in an argumentative manner to the subject of the B— motor, the dealer should have reminded the customer that his own machine was made in either plain or enamel finish, and that he could get him one in the latter finish if he so desired.

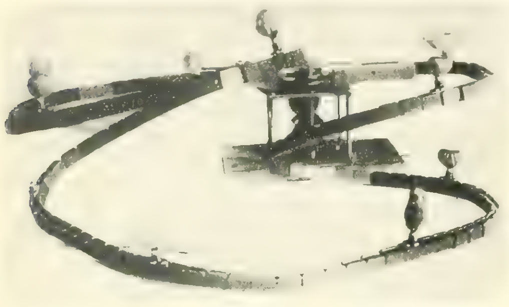
Later, when explaining the other parts of the machine the dealer could then have come around to the question of the motor, pointing out its ease of accessibility, leaving it to the intelligence of the prospect to make the comparison and decide whether or not this was an advantage. It is a poor product that cannot sell on its own merits, without regard for the merits or demerits of competitive lines.

The suggestion might also have been made to the prospect that if he wished, a private demonstration could be arranged for him whenever convenient, either during the day or in the evening, and the hint might have been dropped that if he cared to bring in the lady for whom the machine was intended, she could have the opportunity of clearing up some points that might arise in her own mind, pointing out that the feminine mind sometimes sees things from a different angle.

There is little doubt that having once gotten the prospect inside the store and engaged him in a private conversation the dealer would have obtained further information that would have enabled him to get the prospect's name and address, and some arrangements made for following him up. He should certainly not have been permitted, however, to leave without the necessary pamphlets and information about the machine, and the dealer's card, together with a strong invitation to call again for a further demonstration.

An Attractive Christmas Novelty

The illustration shows an advertising novelty manufactured by Edward A. Dietrich, 910 Cauldwell Ave., New York. It consists of a flexible slotted housing or guideway with a suitable flexible inner-shaft to which can be attached various objects. The flexible shaft is driven by a pair of friction rollers, which, in turn, are driven by a small motor or other suitable motive power. This novelty may be used in practically every field of commercial enterprise for advertising almost any object. The particular object which it is desired to bring to the attention of passers-by is reproduced in miniature, and in transparent form, and placed over lighted bulbs which are attached to the flexible shaft. The device is particularly suitable for Christmas tree decorations, as birds and other objects of that character can be placed over lighted bulbs and made to travel in and around the tree, producing a very novel effect, and creating a feature of interest for both young and old. It is evident that the device could also be used as a scenic railway, as a roller coaster or a loop-the-loop.



Mr. D. F. Strele, Proprietor of The Electric Shop, Saskatoon, one of the finest stores in Western Canada

Mr. E. B. Watts Heads Triangle Conduits Co.

Mention was made in our last issue of the Canadian Triangle Conduits Company, which has just commenced the manufacture in Canada of its various products. Conduits Ltd. of which Mr. J. Herbert Hall is managing director, have been appointed exclusive sales agents of the Canadian Triangle Company's products. We were in error in stating that Mr. Hall would assume the active management of the new company. The managing director of Canadian Triangle Conduits Company is Mr. E. B. Watts.

The Imperial Electric Company

The Imperial Electric Company announce that they have taken over the business formerly carried on by Messrs. Brooks & Kearns, electrical brokers, 125 Simcoe Street, Toronto, and will trade under the name of the Imperial Electric Company at 58 Temperance Street. The company will specialize in tungsten, nitrogen and other types of incandescent lamps. They will also deal in standard electrical appliances and accessories. The personnel of the new company includes Mr. G. F. Brooks and Mr. E. D. McCormack, an old C. G. E. man. The motto of tht company is—Service. Its slogan—High-class goods at reasonable prices, and its policy—Give and take in the matter of a square deal.

Compliments For Non-Twist Products

Mr. F. D. Parmenter, manager Non-Twist Canopy Ring of Canada, Limited, is receiving some very complimentary expressions of opinion on his new devices. Contractors who have used them freely express the opinion that they are great time savers—which in these days, means money—and that they produce a very neat appearing fixture.

Trade Publications

The Harvey Hubbell Company of Canada Ltd. are distributing a folder describing and illustrating the Hubbell current tap.

The Crouse Hinds Company of Canada, Ltd., are distributing booklet 1000-T, describing, with illustrations, this company's newest condulet materials.

Spielman Agencies, Reg'd., 45 St. Alexander Street, Montreal, who are sole Canadian agents for the insulating varnishes and compounds manufactured by Griffiths Bros. & Co., of London, Eng., are distributing an interesting catalogue which contains a quantity of useful information regarding these products and their practical application. It is a publication which should be in the hands of every man who is interested in insulating materials.

The Canadian Blower & Forge Co., Ltd., Kitchener, Ont., have issued a new general catalogue, No. 19, describing and illustrating very completely their various products, including forges, blowers, exhausters, fans, disk fans, drills, punches, shears, bending machines, tire setters, combination woodworking machines, fan system apparatus for heating, ventilating, drying and mechanical draft, air washers, humidifiers, dehumidifiers, pumps, etc.

The power line constructed between Greenwood and Copper Mountain, British Columbia, by the West Kootenay Power and Light Co., Ltd., has been completed and is now in operation. This extension is comprised of a single 110,000 volt line, the distance between the two points being 108 miles. This makes one of the longest transmissions in Western Canada.

Current News and Notes

Bedford, Que.

Messrs. Vincent & Say Electric Co., 351 Union Ave., Montreal, have been awarded the contract for electrical work on branch of Molsons Bank, Bedford.

Brampton, Ont.

The Caledon Telephone Co., Brampton, have agreed to sell their system to the municipality for the sum of $56,000, a figure reported to be considerably lower than that set by the valuators.

Courtenay, B. C.

Mr. C. S. Wood of Courtenay has been awarded the contract for electrical work on $47,000 school being erected at Courtenay by the provincial government.

Fairville, N. B.

Tenders will be called in about two weeks for electrical work on 15 bungalows being constructed at Fairville, N.B., at an estimated cost of $75,000. Architect, Charles Archibald, 102 Prince William Street, St. John, N. B.

Hamilton, Ont.

Messrs. Culley & Breay, 35 King St. West, Hamilton, have been awarded the contract for electrical work on addition to school on East Picton St.

Messrs. Jack Bros., 14 Wellington St. South, Hamilton, have been awarded the contract for electrical work on $500,000 factory being erected by the Canadian Cottons, Ltd.

The Canadian Westinghouse Company are erecting a $10,000 power house on MacDonald Avenue, Hamilton. The building will be one storey, brick construction, 40 x 60 feet.

Messrs. Culley & Breay, 35 King St. W., Hamilton, have been awarded the contract for electrical work on $75,000 residence under construction by P. D. Carse, 484 Main St. E., Hamilton.

Messrs. Culley & Breay, 35 King St. W., Hamilton, have been awarded the contract for electrical work on $200,000 factory being built on Lottridge Street by Messrs. Porritts & Spencer Canada Ltd.

Kitchener, Ont.

The Star Electric Co., 23 Young St., Kitchener, has been awarded the contract for electrical work on $30,000 departmental store just completed at 20 King Street, Kitchener.

Contract will be let for electrical work on $150,000 theatre being erected in Kitchener by the Independent Theatres of Ontario, Ltd. Architects, Hall & Duerr, 209 Lumsden Bldg., Toronto.

Montreal, Que.

Messrs. R. S. Muir & Co., 32 Park Ave., Montreal, have been awarded the contract for electrical work on seven $20,000 residences erected on Belgium Ave., Montreal.

Contract will be let for electrical work on $100,000 power house under construction in Montreal by the Berliner Gram-O-Phone Co. Ltd., St. Antoine Street, Montreal.

The Canadian Comstock Co. Ltd., 10 Cathcart Street, Montreal, have been awarded the contract for electrical work on $400,000 factory being erected in Montreal by the Berliner Gram-O-Phone Co. Ltd.

Mr. W. Rochon, 454 Lafontaine Park, Montreal, has been awarded the contract for electrical work on school "St. James" and residence for teachers, being erected in Montreal at a cost of $155,000, by the Roman Catholic School Commission.

Mr. J. A. Roy, 221 Van Horne Ave., Montreal, has been awarded the contract for electrical work on 42 residences being built by the Senneville Development Co., at an approximate cost of $168,000.

The Direct United States Cable Company have just sold their cables and equipment to the British Government for the sum of $570,000. The cables thus pass from American to British control, the shareholders of the United States company receiving approximately £6 per share.

Ottawa, Ont.

Mr. Stan Lewis, 63 Metcalfe Street, Ottawa, has been awarded the contract for electrical work on $50,000 factory being erected on Wellington St., Ottawa, by the Ottawa Paint Works.

An order in Council has been passed reducing the export license of the Ontario Hydro-electric Commission from 45,000 to 40,000 kilowatts, the Canadian Niagara Power Company from 40,000 to 25,000 kilowatts, and the Electrical Development Company (Toronto Power Company), from 25,000 to 15,000 kilowatts. This does not reduce the power at present under export, but prevents any increase in the quantity to be exported by any of these developing companies without the consent of the Federal authorities.

Ponoka, Alta.

Messrs. Hillas Electric Co., of Edmonton, Alta., have been awarded the contract for electrical work on $50,000 laundry being built at Ponoka, Alta., by the provincial government.

Portage la Prairie, Man.

The Star Electric Co., 191 Portage Ave., Winnipeg, has been awarded the contract for electrical work on $100,000 custodial building for feeble-minded being erected at Portage la Prairie by the provincial government.

Quebec, P. Q.

Messrs. Heating Specialty, Ltd., 42 Juror Street, Quebec, have been awarded the contract for electrical work on $50,000 addition to St. Patrick's Parish Home, Quebec.

The civic finance committee recommended to the City Council that the Quebec Railway, Light, Heat and Power Company be authorized to charge $1.75 per 1,000 cubic feet for gas for a period of one year, dating from November 11, under certain conditions. The company is now charging $1.25 per thousand.

Regina, Sask.

The financial tide at the city power house has turned, and the deficit which has been steadily climbing has commenced to recede, it was reported by the city official recently. The improvement is due to the completion of the thorough overhauling and repair of all the machines, with the result that the fuel cost of generating energy dropped twenty-five per cent. The plant at the old power house, which was used all summer as an auxiliary, has been closed down, relieving eight or nine men, with a consequent reduction in the pay roll. When the new 5,000 kilowatt generator is installed the officials expect to be able to cut the fuel cost of generating by about forty per cent.

Sault Ste. Marie, Ont.

The Rapid Electric Co., 725 Queen Street East, Sault Ste. Marie, have been awarded the contract for electrical [illegible] branch of the Canadian Bank of Commerce under construction at Sault Ste. Marie.

Sherbrooke, Que.

In our issue of October 15th, under the heading of Current News and Notes, we mentioned that the Doherty Electric Co., of Sherbrooke, had been awarded the contract for electrical work on $200,000 branch of Canadian Bank of Commerce being erected in Sherbrooke. This should have read the Donahue Electric Co., 30 Wellington Street, Sherbrooke.

St. Catharines, Ont.

Messrs. Clifford Electric Co., 19 Ontario St., St. Catharines, have been awarded the contract for electrical work on $35,000 Sunday school and gymnasium being built by the First Presbyterian Church, St. Catharines.

St. Johns, Nfld.

Contract will be let for electrical work on bank being erected at St. Johns, Nfld., by the Royal Bank of Canada, at an estimated cost of $230,000. General Contractor, Dickie Construction Co., Ryrie Bldg., Toronto.

St. John, N.B.

An increase in capital stock of $400,000 was recently granted the New Brunswick Telephone Co. This amount is to reimburse the company for money borrowed for plant extension. The total authorized capital of the company is now $2,322,620.

Sydney, N. S.

The McKay Electric Co. Ltd., Charlotte street, Sydney, has been awarded the contract for electrical work on $60,000 branch of the Bank of Nova Scotia under construction at Sydney.

Contract will be let for electrical work on $75,000 branch of the Canadian Bank of Commerce being erected at Sydney. Architects, Dominion Realty Co., 23 King West, Toronto.

Toronto, Ont.

Mr. John T. Ransom, 34 Victoria Street, has just completed the erection of four houses on Arlington Ave., and would like quotations on electric fixtures.

Messrs. H. Hicks Co., 203 Church St., Toronto, have been awarded the contract for electrical work on repairs to apartment house at 19 Nanton Ave.

The Toronto Electric Contracting Co., 452 Bloor West, Toronto, have been awarded the contract for electrical work on a $15,000 addition to office building at 16-18 McCaul Street.

Mr. P. G. Dunn, 3124 Dundas West, Toronto, has been awarded the contract for electrical work on two residences and garage being built on Gothic Ave., by Messrs. McIlroy & Lowrie.

Contract will be let for electrical work on $40,000 carburetor plant being built on Kingston Road by the Canadian Tygard Engine Co. Architect, H. R. Watson, 907 Excelsior Life Bldg., Toronto.

Messrs. Bennett & Wright Co., 72 Queen East, have been awarded the contract for electrical work on $50,000 alterations to manufacturing plant of the Exide Battery Co. of Canada, Ltd., at 153 Dufferin Street.

Messrs. Richards & Cross, 79 King East, Toronto, have been awarded the contract for electrical work on $40,000 extension to manufacturing building of the Farmers Dairy Co., Ltd., Walmer Road.

The Canada Gazette announces the incorporation of the Nitro Electric Company, Ltd., with head office at Toronto, for the purpose of dealing in and selling, and acting as agents of electrical fixtures, lamps, etc. The capital stock of the company is $40,000.

The number of passengers carried on the Toronto civic car lines is steadily increasing, and it is expected will soon reach the 3,000,000 mark. The report for October shows an increase of nearly 20 per cent. over that of the same period in 1919, the increase in revenue being over 17 per cent. The figures are:

	1920	1919
Passengers carried	2,934,704	2,457,091
Revenue	$48,513	$41,373

Vancouver, B. C.

Mr. George Kidd, general manager of the British Columbia Electric Railway is at present in Eastern Canada on a three weeks' semi-business trip, which will include Montreal and Toronto.

Walkerville, Ont.

Contract will be let by the general contractor, Russell Navin Construction Co., Walkerville, for electrical work on 56 residences to be built on Walker Road at an approximate cost of $280,000 by the Border Housing Co. of Walkerville.

Contract will be let by the general contractor, Russell Navin Construction Co., Walkerville, for electrical work on 44 residences to be built on Windermere Road at an approximate cost of $220,000 by the Border Housing Co. of Walkerville.

Waterloo, Ont.

Messrs. Beattie-McIntyre, Ltd., 72 Victoria Street, Toronto, have been awarded the contract for electrical work on $200,000 office building being erected at Waterloo by the Mutual Life Insurance Co.

Winnipeg, Man.

Mr. J. C. Higgerty, 874 Strathcona Street, Winnipeg, has been awarded the contract for electrical work on $25,000 church being erected at Hugo and Mulvey Avenues, Winnipeg, by the Parish of St. Michael.

A special general meeting of the Winnipeg Electric Railway Company is called for December 4th, for the purpose of ratifying and approving a by-law of the directors increasing the common capital stock of the company to $11,000,000 from the present authorized amount of $10,000,000.

Song of a Salesman

Oh I love to stroll out through the pastoral fields
To see power plant engineers.
Communing with nature, my spirits it yields—
(Well, perhaps it does—once in ten years!)

I tramp and I trudge while the sweat of my brow
Mingles with dust and it muddles,
Far on the horizon—(ah ! I see it now !)—
Is the smokestack I chase through the puddles.

It beckons, that smokestack, recedes as I walk—
Every mile makes it farther away.
I look at my watch, time is passing—I balk—
But onward my soul ! To the fray !

The loaded down sample case weighs half a ton,
My blistering palms swell and burst.
"The first seven miles is the hardest, old son,
Step along y'poor mutt"—here's the worst—

Well I jump the old ditch, barb-wire tears out a seam
I pass through the gate with a shout—
I shoot in my card, and collapse with a scream—
[illegible] engineer has gone out!

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MacLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor.
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 296 Broadway
CHICAGO - - Room 803, 63 E. Adams St.
LONDON, ENG. - - 16 Regent Street S.W.

ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C. MacLean, Limited.

Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Vol. 30 Toronto, December 1, 1920 No. 23

Co-operation Will Carry Electrical Industry Through Crisis

While there has been a noticeable slowing up in the electrical business the retail end of the industry is faring much better than most other industries. In shoes and clothing, for example, the retailers have been driven to reduce prices greatly, in many cases below cost, in an endeavor to stimulate buying by the public. This has naturally reacted on the source of supplies and the result is that many manufacturing plants have been closed down. In contrast to this condition, however, electrical retailers merely state that business is "quiet." There has, fortunately, been no resort to price cutting to reduce stocks quickly.

It is not entirely clear what all the contributory causes are which thus leave us in a more favored position than many other industries, but two or three conditions suggest themselves. Take the case of the shoe dealer. We are told that many of them were stocked up to the roof, in anticipation of scarcity. This was possible because the shoeman has been established in business so long that his credit, in [illegible] beginning. He buys stock from hand to mouth, so to speak, [illegible]

There is another item, too, that doubtless has a stabilizing influence. [illegible] speaking, staple goods, i.e., it does not change with the whims of the public [illegible] etc. There is no need for undue haste therefore in getting rid of any certain type of article before the new styles come in next month. What is not sold to-day is almost as good value six months hence. These are conditions surrounding the electrical industry that tend to make it one of the most attractive and one of the most assured of profitable turnovers in existence.

The contracting end of the industry has, perhaps, been somewhat less fortunate. Just at the moment there is a slowing down in the building industry which has cut the number of wiring contracts available and work is being done on narrower margins. Fortunately, however, the electrical contractor is not dependent entirely on new construction, and the present moment affords a splendid opportunity for a survey of the field of power and lighting supply with a view to introducing better working conditions and greater economies. Long before all the unwired buildings have been properly equipped and the many improvements made to the present inadequate installations the building industry will have got into its stride again.

And inasmuch as the contractor and the retailer represent the "unloading" end of the industry it is important that the other sections of it—manufacturer, wholesaler, central station—should do everything possible to keep them in steady operation. Assistance may well be given in financing, in education for the contractors and retailers themselves, and in education for the general public so that their interest in matters electrical may be quickened and their desire to purchase proportionately intensified. If it has been good business to work together in the past it is good business twice over—it is the only possible and sane course—to co-operate to the fullest extent when the throat of the industry's outlet shows signs of choking up.

Conditions are not yet as bad in Canada in the retail business as in the United States, and we don't want them to become as bad. The latest issue of Bradstreet's to hand, Nov. 11th, for example, under the heading "Trade at a Glance," prints remarks on the situation. Of the thirteen cities in Canada the reports covering the one item, "Collections," give two "fair," six "fair to good," four "good" and one "improving." The report on forty U. S. cities is in marked contrast to this. Thirty collections are marked "slow," eight are "fair," one is "improved" and one "poor."

Up to the present time Canada appears to have escaped the decided reaction being felt so generally by our neighbors to the South. So far as our own industry is concerned can we not see to it that there is sufficient co-operation to keep things from getting any worse than they are.

Varied Comment on Value of More Detailed Statistics

A number of interesting letters have come in with reference to the suggestion made in our issue of November 1st by Mr. F. W. Johnson of the Northern Electric Company that the government be requested to tabulate more detailed statistics regarding the electrical industry. All of these replies admit the advisability of much greater detail and accuracy, and some of the letters are reproduced below. The branches of the trade that appear to be more particularly interested in the subject are the manufacturers and jobbers of the smaller kind of electrical supplies. In addition to this, as one of the letters truly points out, we require more statistical information with regard to the size and character of our potential markets.

Of course, the value of these more detailed statistics would vary considerably with different firms. Certain firms have already gathered through their own organizations an amount of valuable information which is the more useful to them because the [illegible] tion. These firms might argue that accurate government statistics would thus remove the handicap they have been able to place their competitors under by their better organization and greater expenditures on detail. While this may be true to a certain extent it is doubtful whether manufacturers and wholesalers as a class would consider this argument as being in the best interests of the industry as a whole. The letters which follow will be read with interest.

St. Catharines, Ont.

Editor, Electrical News:

Referring to Mr. Johnston's letter on the subject of Statistics on Electrical Manufacture and Distribution, published in your issue of Nov. 1st, we fully agree as to the inadequacy of information furnished by the Customs Authorities.

As manufacturers of transformers and watthour meters, we would be interested to know, under the classification "Electric Meters," what proportion of Imports covered Indicating Portable & Switchboard Instruments, and what proportion covered Integrating Watthour Instruments, and, also, under the classification "Transformers," what proportion of imports covered transformers for Light & Power, and what proportion covered Miscellaneous Transformers, such as Sign Lighting, Bell Ringing, and Current and Potential Transformers. However, such subdivided classification is not of as much importance to us, as it would be to manufacturers of household commodities, or supplies.

Yours truly,
The Packard Electric Co., Ltd.
Geo. C. Rough, President.

Toronto, Canada

Editor, Electrical News:

The article in your November 1st issue of "Electrical News," on page 36, and your letter of November 3rd brings to mind a matter that the writer thinks of the utmost importance to the electrical industry in Canada.

As a member of the Associated Manufacturers of Electrical Supplies in the U. S., I have been in receipt of their statistics showing the exports of electrical supplies to the different countries, more particularly to Canada, and, while it is an improvement on the Canadian statistics, still I do not think that it goes far enough.

I am sure the Association of the Canadian Manufacturers of Electrical Supplies would be only too glad to do anything they can to further a movement whereby they would be enabled to obtain more definite information which it seems impossible to obtain at this time.

Yours truly,
Conduits Company, Limited.
J. Herbert Hall, President.

Toronto, Canada

Editor, Electrical News:

Noting your letter of November 3rd, and also after reading the letter of the Northern Electric Company, it would appear to me that the information desired could be obtained in two ways, either from a statistical sheet sent at fixed periods to the different manufacturers and wholesale houses, but much more accurately from the records of the Customs House where these goods come through as it would seem quite possible that the goods could be classified so that the customs authorities could easily enter up the amount of the incoming goods under the proper classification. If one depended on the returns from manufacturers and wholesale houses the material imported directly by consumers and by dealers would not be tabulated.

Yours truly,
The Masco Company, Limited.
C. A. McLean

Toronto, Canada

Editor, Electrical News:

We beg to acknowledge receipt of your letter of November 3rd, and we have carefully looked over the article in your November 1st issue, to which you make reference.

We quite appreciate that the present conditions are very unsatisfactory as regards the accuracy of information obtainable from the usual sources, but we do not see how it is possible for [illegible] with a view to improving matters. It seems to us to be a matter which the Department of Customs at Ottawa is alone able to deal with in a comprehensive manner, and representation should be made to the proper authority by some of the Association connected with the electrical industry, with a view to having a better and more detailed tabulation of customs returns made.

Yours very truly,
Canadian Johns-Manville Co., Ltd.
Thos. M. Staunton.
Manager Electrical Department.

Montreal, Canada

Editor, Electrical News:

Your letter to us of the 4th inst., to hand, in reference to statistical information, re Electrical material and apparatus. For your information, we might advise that the Electrical Supply Manufacturers' Association, Room No. 206, No. 110 Church St., Toronto, has been compiling such information as you referred to. Of course, they have not been doing this for so many years as to get a real good idea of the requirements in Canada.

You will appreciate that most of the manufacturers have been under the impression that exporters from other countries than Canada might use this to our disadvantage if the data was made public.

Yours truly,
The Duncan Electrical Co., Limited.
Chas. Duncan, Manager

Walkerville, Ont.

Editor, Electrical News:

We have yours of the 3rd regarding the lack of statistical information at the disposition of the electrical manufacturers and jobbers of this country and had already read with interest the article referred to in addition to your editorial in a previous issue.

We quite agree with the attitude taken by Mr. Johnson, of the Northern Electric Company, and believe that the time is surely at hand when those interested in the electrical trade should get together and furnish the government with an outline of the information that we believe to be essential to the welfare of this industry. It might be well, also, to point out to the various members of the electrical industry the necessity for attacking this subject from the standpoint of the welfare of the industry as a whole so that we may not be guilty of asking for information which we ourselves may more easily obtain, thereby adding to the already large financial burden that the country is now carrying.

Though we recognize the necessity for obtaining the information referred to in Mr. Johnson's article we would suggest that it may be within the power of the large jobbers of this country to obtain information in their own ranks which would enable them to obtain much greater results in their efforts to reach the consumers with Canadian made products.

As we see it, more statistical information is required on the size and character of our potential markets than on the actual amounts of our importation and we sincerely trust that your editorial will arouse a country-wide interest in this question, which will result in safer, cleaner and better conditions for the whole of our people.

Yours truly,
Square D Company
J. L. Frink, Manager

Toronto Engineer Talks of Newfoundland

The Electric Club of Toronto had a most interesting address at their noon-day luncheon on Friday, November 5, when Mr. A. L. Mudge, electrical engineer of the firm of Kerry & Chace, Limited, Toronto, addressed the members. Mr. Mudge spent the greater part of last winter in Newfoundland, investigating the power possibilities in the southern portion of the island and he told the club, in a most entertaining way, not only of some of the difficulties encountered by the engineers in their work, but also much about the habits, traditions and characteristics of Newfoundlanders. The members have rarely listened to a more delightful address.

Motors and Their Correct Application

The Problem of Applying Motors to the Ultimate Machine Involves (1) An Analysis of the Power Characteristics of that Machine and (2) A Complete Knowledge of the Nature of the Motor to be Applied and of the Modifications of Design that are Possible thereon[*]

In opening a talk on the subject of motor applications, it is proper first to call your attention to the very important place that the use of power has come to assume in our modern civilization. The steam engine is only about 150 years old. Before that time the only source of power, outside the winds that blew our ships to their uncertain destinations, was the power of our domesticated animals. The horse and the ox then took the place of the passenger and freight locomotives of today. The treadmill was the only "motor" known. Power —as we understand that concept today—had attained no place in man's daily life. There were no railroads; transportation of mails, travelers, and goods was done by the post-chaise, the stage-coach, and the ox-cart. It required power to bring the railroad into being; a railroad is simply the mechanism and organization necessary to apply mechanical power to transportation. There were no steamships in those days and the only methods of ship propulsion were the winds and the galley slave. The modern steamship is simply a mechanism designed for the purpose of applying mechanical power to the propulsion of ships. The automobile and the airplane are entirely dependent on mechanical power in their very conception, and would of course be impossible without it. But the most far reaching effect by far of the use of mechanical power on our modern civilization lies in the rise of the factory system, which has been made possible only by power. Time was when every household depended almost entirely upon itself for everything it needed. This was the day of the spinning wheel and of all the other home industries which its use typified. It is the use of mechanical power that has made it possible to transfer manufacturing industries from the home to the factory, and has thereby brought about the far reaching social, economic and political changes that necessarily followed that transfer.

In further elaboration of the effects of power on the trend of civilization, let me quote a few paragraphs from the book entitled "The New Epoch" by George S. Morison.

General Conditions

"Students of primitive society have divided the early development of the human race into ethnical epochs, representing various conditions of savagery and barbarism, and finally culmination in civilization; they recognize three periods of savagery, followed by three periods of barbarism. In the lowest epoch men were little superior to the animals by which they were surrounded. With the use of fire the second period began. With the invention of the bow and arrow, the most primitive form of projectile, man entered the third period. With pottery, and all that it implies, he passed from savagery to barbarism. The next advance came with the domestication of animals, which gave man another power besides his own physical strength. With the manufacture of iron the last of the barbarous periods was entered. By the invention of the written alphabet the primitive race was promoted from barbarism to civilization.

The use of fire placed man in a condition very different from that of other animals, giving him a power the uses of which are yet not fully developed. The domestication of animals was hardly less important, and although where animals suitable for domestication did not exist tribes were able to pass this period without them, their weakness was apparent when they came in contact with other races whose conditions were not so limited. Finally the invention of a written language made the work of one generation available for its successors and produced historical civilization.

The changes which mark the advances from period to period are all material improvements; in every instance they are characterized by some distinctive physical device which has enabled man either to utilize his own strength better than before, or to increase his power by adding other animate or inanimate force. The race that passed from one period to another acquired resources which it had not before; in the contests which characterized the life of the primitive man, the men of a lower period fell before those who had risen higher. But, though the devices were of a purely material character, they gave opportunities for mental and moral improvement which alone made further advance possible, till finally the written alphabet resulted in that preservation of knowledge which has made the intellectual efforts of thirty centuries available for ourselves. With the dawn of civilization, the ethnical periods have been considered closed; subsequent growth has been the natural advance of civilization marked by the events which make written history.

But there is no reason why the epoch which began with writing should be the last. It only needed a new capacity, radically unlike those which have gone before, to make an epoch in civilization as distinct as those in primitive society. Such new capacity has now been found; another epoch has begun. Fire, animal strength, and written language have in turn advanced men and nations; something like a new capacity of explosives and again in the invention of printing; but the capacity of man has always been limited to his own individual strength and that of men and animals which he could control. His capacity is no longer limited; man has now learned to manufacture power, and with the manufacture of power a new epoch began. These words are used advisedly; creation, whether substance or force, is not given to man, manufacture is not a creation, but to change inert matter from on form to another in such way as to generate power is to manufacture power, and this we can do.

Furthermore, not only does the manufacture of power mark a new epoch in development, but the change is greater than any which preceded it; greater in its influence on the world; greater in the results which are to come.

The manufacture of power means that wherever needed we can now produce practically unlimited power; whatever the measure of a single machine, that machine can be used to make a greater one; we are no longer limited by animal units, confined by locations of waterfalls, nor angered by the uncertain power of the wind. Power can be had where it is needed and when it is needed. The power generated in a modern steamship in a single voyage across the Atlantic is more than enough to raise from the Nile and set in place every stone of the great Egyptian pyramid."

---

[*] Address by Mr. F. M. [illegible] before The Electric Club of Toronto.

Mr. Morison's book can be read in a couple of hours and I heartily commend its perusal to anyone desiring to get an adequate conception of the effect of power and its distribution on our modern civilization. In one passage in the above quotation, Mr. Morison says that "wherever needed, we can produce practically unlimited power."

As an electrical engineer, I wish to put in a claim that it is only by the efforts of that branch of engineering that this statement has been made effectively true. While it is possible to generate and transit power to any place "wherever needed," by means other than electrical, the expense and losses by those methods were so great that it was not generally done until the advent of electrical distribution. It is by the electrical distribution of power and only by electrical ditribution that we can approach the ideal that Mr. Morison has set forth. The "wherever needed" that Mr. Morison mentions for the production of "practically unlimited power," is a somewhat exaggerated claim and could not be even approached without the aid of the electrical engineer and manufacturer. "Wherever needed" is wherever man is, whether in his home, his office, his factory, or in transit between any of them. Even the electrical engineer has not been able to distribute power universally, but he has come infinitely closer to it than was possible before his advent. The ability to distribute and utilize power "wherever needed," is what has given electricity its opportunity. It is the electrical engineer by his ability to distribute power "wherever needed" that has made possible the "new epoch" portrayed by Mr. Morison. The particular point that I wish to make is that the significant thing that is bringing about Morison's "New Epoch" is not entirely the "manufacture" of power, but largely the ability to distribute this power to "wherever needed," and that latter ability is the distinct contribution of the electrical profession. It is the problem of distribution that has been solved most completely by the alternating current polyphase system. The ease, efficiency, and safety with which alternating currents can be changed from one voltage to another by means of the static transformer has given that system so great an advantage that it has no competitors, in so far as the distribution problems are concerned. In point of adaptability to driving the great multiplicity of loads that motors are applied to, the alternating current motor lacks some of the flexibility of the older direct current motor.

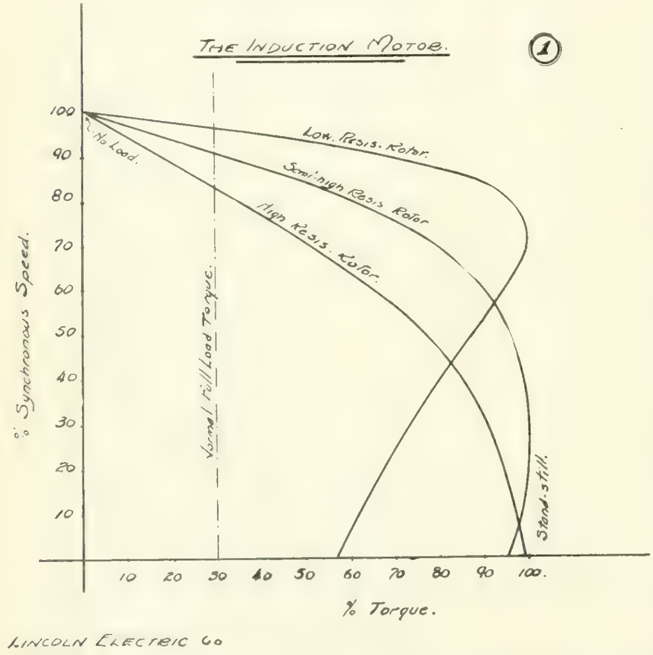


Fig. 1.—Showing speed-torque characteristics of standard polyphase induction motor.

Before the advent of the alternating current polyphase motor the direct current motor had a considerable vogue, and in some applications it's greater flexibility has caused it it's retention in service in spite of the increasing prevalence of the alternating current polyphase distributing systems.

The contest that has been waged between a.c. and d.c. during the last 25 years has gone in favor of a.c. not because the a.c. motor is more rugged, but solely due to the superiority of the a.c. for distribution. It is the ability to put power "wherever needed" in the words of Morison, that has won the battle for the alternating current. The problem of applying motors to the diversified work that they have to do is in general more easily solved by the d.c. motor than the a.c. However, by careful analysis of the work the motor has to do as well as a complete knowledge of the characteristics of the a.c. polyphase motor the a.c. motor has been successfully applied to every class of work that motors are called on to do.

The ease of distribution of a.c. polyphase currents is bringing about a complete revolution in the method of operating our modern factories. Time was, when the water-wheel or the steam engine was the source of power, that is was customary, to equip a factory with a single prime mover, and then distribute this power throughout the plant by means of shafts and belts. During this period, shafting and belting took so firm a hold that it is exceedingly difficult now to think of a factory installation without thinking of a room full of shafting and belts.

The "wherever needed" is not a single point in the factory, but the individual machines that are operated therein. To carry Morison's dream to its logical conclusion, we must power equip, not a factory, but the individual machines in that factory. The electric motor is successfully taking the place of the steam engine in factory drive, but its job is only half done when we substitute a motor for the former engine and leave the belts and shafting. The job is completely done only when the idea of motor drive is carried to the ultimate of the "wherever needed" that Mr. Morison emphasises.

Now the problem of applying motors to the ultimate machine wherein power is used involves first an analysis of the power characteristics of these machines, and second a complete knowledge of the nature of the motor to be applied and of the modifications of design that are possible thereon. The most important characteristic of a load, at least, when considered in connection with a driving motor, is its speed torque character. The most usual demand in this respect is that the speed shall be independent of the torque or practically so. When factories were driven by a single prime mover, either water or steam, this constant speed characteristic was the one demanded and when electric motors began to supplant other prime movers, it was natural that this constant speed characteristic should be the one most in demand. Both the a.c. and the d.c. motor were able to meet this requirement easily.

A second requirement often demanded in a load is the ability to adjust the motor speed to a new value and when so adjusted, still to have its speed independent of its load. This is a requirement that can be met by the d.c. motor with relative ease, but it is impossible of fulfillment by the a.c. motor. It is this requirement that has done more to keep the d.c. motor in service in competition with the a.c. than any other one requirement. Machining tools is the particular duty where this requirement is most in demand. The absence of this ability to give constant speed characteristic over an adjustable range of speed is the a.c. motor's weakest point. Methods of securing this ability with the a.c. motor undoubtedly will be forthcoming in time; but whether they can be secured at a reasonable cost and, what is more important, without a sacrifice of the ruggedness and reliability of the induction motor, is still an unanswered question.

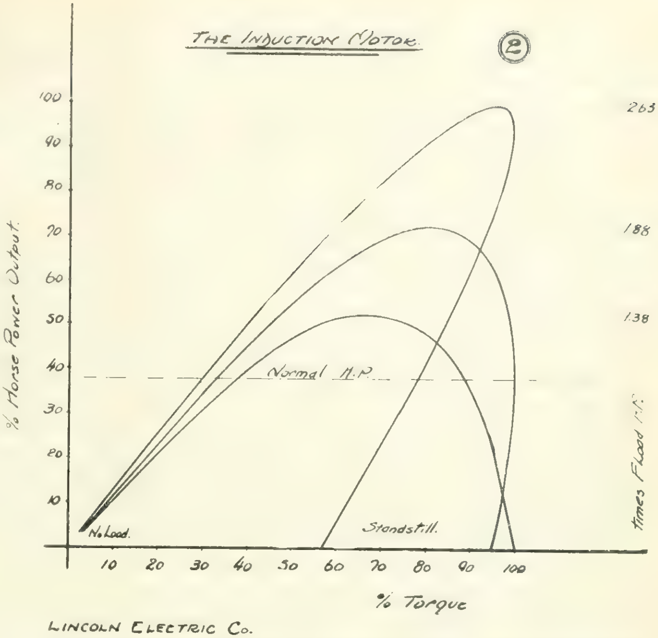


Fig. 2.—Showing how horsepower output of the three motors in Fig. 1 varies with the torque.

A third load requirement frequently called for is one where torque forms the important element rather than speed. Such loads are typified by the elevator and the hoist. In applying motors to such loads, constancy of speed with varying torques is of no consequence. The type of motor to meet such requirements successfully is quite different from the first two, where constancy off speed is essential. The operation of railway cars and trains is another example of load where torque plays a much more important part than speed.

The above three classes of load are only a part of those that are met in practice. Loads may be classified not only in regard to their speed-torque characteristics, but also in regard to their power-time character or the "intermittancy" of the load. Consider for instance the power-time character of a punch-press or a forging press. During a large part of the time of operating a machine of this kind, the only duty of the motor is simply to turn the machine over idle. At intervals, more or less frequent, depending on the nature of the work, power is expended on the work for a short time after which there is another period of comparative rest. In a punch-press for instance, the time during which power is actually being expended in shearing the metal is exceedingly small, but during that small instant the rate at which power is used may be exceedingly large. In such applications, it is customary to use a fly-wheel which stores sufficient energy to do the active work of shearing the metal and then rely on the motor to restore the energy to the fly-wheel during the comparatively long interval between successive strokes. The characteristics of a motor for this work obviously differ materially from that to operate a lathe for instance, where the work is done at a uniform rate. Or, take the case of an elevator motor, the rate of doing work here varies greatly between the starting period, when it is necessary to accelerate the car and it's load, and the [illegible]

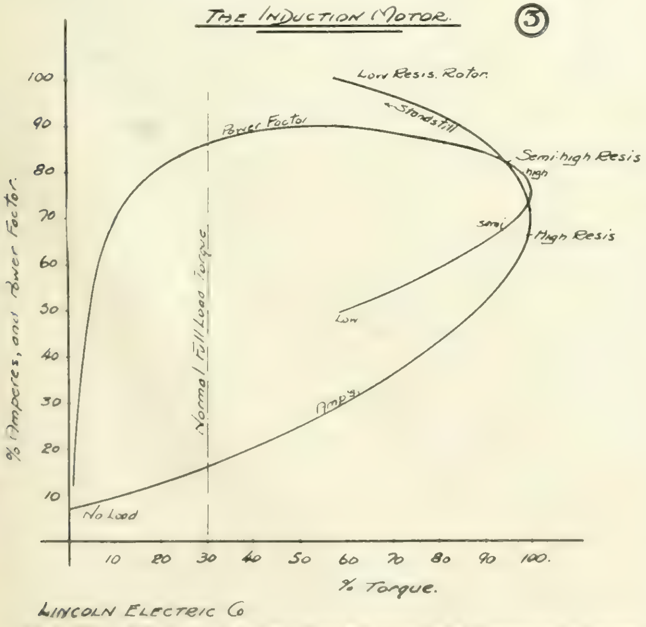


Fig. 3.—Showing how amperes and power factor of motors in Fig. 1 vary with the torque.

to lift the load. Also, the load on the motor varies greatly depending on whether the car with its maximum load is being lifted or lowered. The motor obviously must be of sufficient size and character to care for the maximum conditions that are imposed on it, and the problem of the proper rating to give the motor that does the work properly is not an easy or a simple one.

As indicated in the foregoing, the problem of applying a motor to it's load is first: a thorough understanding of the nature of work to be done, and second: a thorough understanding of motor characteristics and the modifications that may be made in the motor by control of its design. Both of these points should thoroughly understood and analysed, before a proper motor application can be made.

Since at least 75 per cent. of the motors now being applied to loads are now of the alternating current polyphase type, it is fitting that we consider briefly the normal characteristics of the standard motor of this type, together with the special characteristics with which it may be endowed by modifications of design.

Figure 1, herewith, shows the speed-torque characteristics of a standard polyphase induction motor. The upper one of the three curves shown is the speed-torque curve of a typical standard induction motor. In these curves, synchronous speed is taken as 100 per cent., and the maximum torque that the motor will develop is taken as 100 per cent. The full-load torque—that is, the torque at which it will operate continuously without overheating, is only about 30 per cent. of the maximum torque.. It will be noted that the full-load torque occurs when the speed has dropped to about 96 per cent. of the synchronous speed; that is, the slip is about 4 per cent. If overloads are applied, the speed continues to drop and the torque to rise, until the torque has risen to a value of a little more than three times that at full-load, and the speed has dropped to about 75 per cent. of synchronous. Then occurs the so-called "pull out" point; that is an attempt to pull still more load with more torque causes the motor rapidly to come to a standstill because beyond that point the torque decreases rapidly with decrease in speed. This is accompanied by a rapid increase as is shown by Fig. 3. This "standard motor" is provided with a low resistance rotor and is the type of motor that is usually referred to as "standard."

If instead of a low resistance rotor, one is provided with approximately double the resistance of the "standard," the middle curve of Fig. 1 will apply. The speed-torque curve of the motor will be distinctly modified by this change in resistance. The slip for a given torque is much greater than in the "standard" motor. Instead of 4 per cent. slip with the full-load torque, we now have nearly 10 per cent. The "pull out" instead of occuring at about 75 per cent. synchronous speed, now occurs at about 30 per cent. synchronous speed. Also, the torque at standstill is nearly a maximum, and the current taken at standstill, as shown in Fig. 3, is considerably less than with the standard motor. In comparing for these curves it is quite obvious that for work that requires large motor torques at speeds lying between approximately one-third and two-thirds of the synchronous speed, the motor with the middle curve is better adapted than the "standard motor." Also, for fly-wheel jobs, that is, where a fly-wheel does not work, and it is the duty of the motor to bring the fly-wheel up to speed again at its leisure, the middle curve is obviously better, since it allows the fly-wheel to give up more than double the energy without bringing the motor to a given load, than in the case of a "standard" motor. For hoist work, where heavy torques are necessary at start and the loss of a small fraction of speed under load is immaterial, experience has demonstrated that this type of curve is highly desirable.

If the resistance of the rotor is still further increased: that is, approximately doubled again, the lower curve of Fig. 1 applies. In this case it will be seen that the slip is still further increased, being about 18 per cent. at full-load torque, and that at standstill the torque is still increasing, that is, the "pull out" point is at some negative speed. This type of motor is applicable to cases where the maximum torques are required at standstill and at speeds up to 40 per cent. or 50 per cent. of synchronous. The elevator is a typical example of this duty. In this duty, the maximum torque is required at standstill since the friction of rest must be overcome at this point and as is well known, the friction of rest in the typical elevator engine is several times that after the first few revolutions. The overcoming of this friction of rest and acceleration of the car from standstill requires the maximum torque at low speeds in this application, and experience as well as theory has shown that this curve is best adapted for elevator work.

A characteristic of induction motors that might be noted is shown by these curves, and that is, that the maximum torque developed by any secondary resistance rotor is the ame. The only difference is the speed at which this maximum torque is a "pull out" point. For the "standard" motor this "pull out" point occurs at about 75 per cent. of sychronous speed, for the "semi-high torque" rotor, the "pull out" occurs at about 30 per cent. of synchronous speed and for the "high torque" rotor the "pullout" occurs at some negative speed, that is, the maximum torque point is not reached until the rotor begins to rotate in a reverse direction.

By using a Slip Ring motor the rotor resistance may be changed at will and a motor of this type may be changed at will to meet any of the speed-torque characteristics shown in Fig. 1. In securing this advantage, however, we have been obliged to use slip rings on the rotor, thereby increasing the cost and reducing the reliability and ruggedness of the machine, but more important, we have very considerably reduced the maximum torque which the motor will produce. These disadvantages make it highly desirable to stick to the Squirrel Cage Construction, if it is in any way possible, to fit any single speed-torque characteristic shown in Fig. 1 to the work to be performed.

Fig. 2 shows how the horsepower output of the three motors shown in Fig. 1 varies with the torque. In considering these curves, we should bear in mind that the main part of the work done by the low resistance and semi-high resistance rotors is preferably close to the sychronous speeds, while the design of the high resistance rotor is such that it can do its best work at speeds below 50 per cent. of synchronous.

Fig. 3 shows how the amperes and power factor of these motors vary with torque. For a given torque, the amperes and power factor of any of the three motors is exactly the same. However, the maximum amperes of the high resistance rotor machine at standstill is only about two-thirds of that of the low resistance rotor. The much higher torque of the high resistance rotor machine gives us at standstill a torque per ampere, about three times as great in the high resistanse rotor machine as in the low resistance rotor.

The analysis that I am able to submit to you today is only the barest outline. Volumes have been written on this subject, and I can give only a small part in the few minutes available to me today. The particular lesson that I would leave with you who use motors is this:

First: Know what your motor has to do.

Second: Fit your motor characteristic to your load.

The Dominion Power and Transmission Company, Limited, are offering a new issue of $600,000 five per cent. bonds due serially from April 1st, 1921, to 1932. The bonds will be placed in the United States market.

The Measurement of Maximum Demand and the Determination of Load-Factor

(Concluded from Nov. 15)

By Mr. Perry A. Borden*

III. Operation on Various Loads

Provided the laws governing the mechanical operation of any type of demand meter are known, it is possible to predetermine the indications of an instrument in which the quantity measured undergoes any prearranged cycle of variations. In comparisons of demand indicators this has frequently been done and an opportunity thus given to study the inherent characteristics of various types of demand measuring devices, particularly at the start and the finish of the duty cycle.

Under actual service conditions, however, the duty cycle is seldom exactly duplicated; and as a slight change in this cycle might produce varying effects upon the operation of different instruments, the element of uncertainty so introduced would seem to justify service tests on actual typical loads as being the only fair comparison of demand meter types.

With the object of carrying out such tests, the writer collected a number of typical instruments, all of which were installed upon an easily portable panel, so arranged as to be cut in on the metering circuits of such typical installations as were accessible. There were three distinct types of meters and, of each type, four time periods. The types were as folows: Lincoln thermal storage (logarithmic); Siemens (Merz type, or block-interval); Westinghouse type R. O. (mechanically lagged).

The time periods were 10, 20, 30 and 60 minutes for the two latter types, and 10, 15, 30 and 40 for the first, it being borne in mind that the time period of a logarithmic meter is arbitrarily defined as the time required for the instrument to reach ninety per cent. of its ultimate indication on a steady load. Each meter was adjusted to its maximum possible accuracy and frequently checked during the progress of the tests. The 10-minute and 30-minute logarithmic meters were supplied by the manufacturer from standard stock parts; the other periods being made up from such material as was at hand. These latter, when tested, were found to have time periods of 15 and 40 minutes respectively; which values were adopted as satisfactory for the tests.

The block-interval meters being of a pre-war European type, it was not practicable to obtain suitable timing gearings; and special methods were used. Instead of cutting new gears for the timing elements, the clocks were removed, and replaced by small solenoids operated from a contactor carried by the master clock in the continuous recording meter.

The mechanically lagged meters were stock instruments, which were fitted with suitable timing gears specially ordered from the factory.

As it is a well-known fact that none of the types of meters commercially used will infallibly measure demand upon an arithmetical basis; and as it was very desirable to have some form of instrument which could be considered as a standard of comparison, it was found necessary to develop and construct a meter for this purpose. As this meter embodies some rather unique features which may be of interest, the following description of its working principles and operation is given.

The instrument itself was built of such odds and ends as could be found among the accumulation upon the shelves of the meter shop. However, as this device was constructed solely for experimental purposes, the use of such a nondescript instrument may be pardoned on the grounds of the interesting and satisfactory results obtained.

To give a clear understanding of the operation, a diagrammatic sketch is shown in Fig. 1. It will be observed that the working principle is exceedingly simple. A paper chart is caused to advance at a speed proportional to the load on the circuit, while a pen is propelled across the paper at a constant velocity in a direction perpendicular to the travel of the chart. The first motion is accomplished by means of a watt-hour meter, controlling the speed of the paper travel, while the second motion is produced by a clock, winding a cord about a friction-driven drum, so that the pen makes its transit of the paper in exactly ten minutes. At the end of each ten-minute period, a contactor driven by the clock energizes an electrical device, which forcibly returns the pen to its zero position, the cord unwinding from its drum, which slips on the arbor of the clock.

As the return of the pen is practically instantaneous it will be seen that the chart takes the nature of a series of curves one above the other, the corresponding ordinates on successive curves being separated by intervals of ten minutes. It will be seen that the slope of any of the curves at any instant is proportional to the load at that instant; and the series of curves may be considered as the translated portions of one continuous curve whose weight from the point of starting represents the integrated value of the load.

Since measurement along any ordinate represents the advance of the paper, i.e. the integrated load, during the time period between two crossings of that ordinate by the pen, it manifestly represents the average load or demand during that period. It only remains, then, for the measurement of maximum ten-minute demand, to select the ordinate whose length between two successive curves is greatest and to express its length in terms of the units measured by the integrating meter.

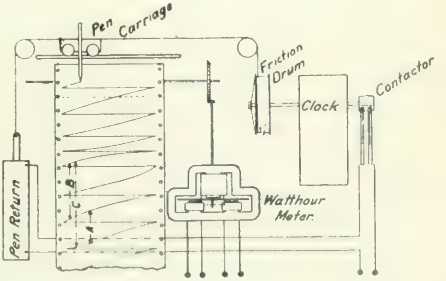


Fig. 1.—Diagram of Continuous Recording Demand Meter

Similarly, demands for twice the normal time period of the meter may be scaled off by measuring the distance

---

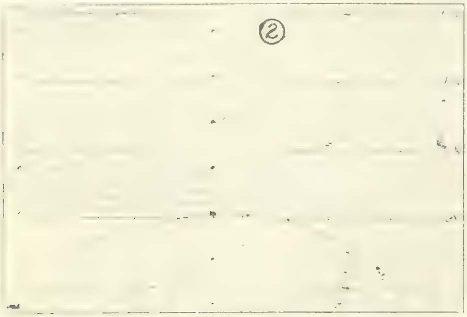
*Engineer Hydro-Electric Power Commission of Ontario before the A. I. E. E. at Philadelphia.

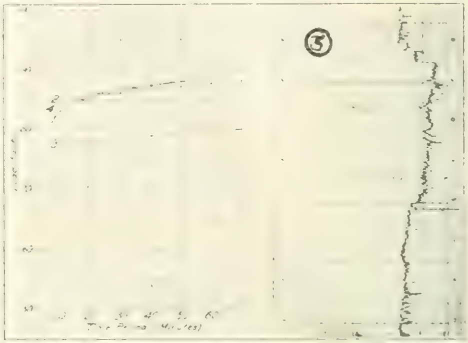
[illegible] es, and for greater multiples of the normal period, by selecting the desired number of curves to be spanned. Thus, from the one chart it is possible to determine, not only the true maximum demand for the fundamental period, but the demand for any multiple of that period.

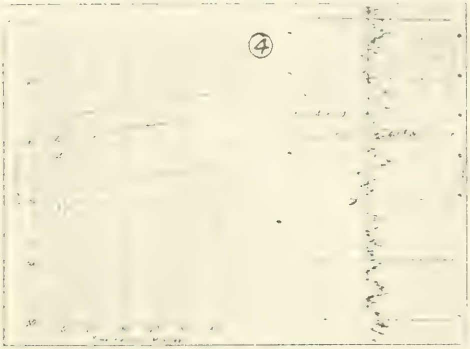
[illegible] the maximum

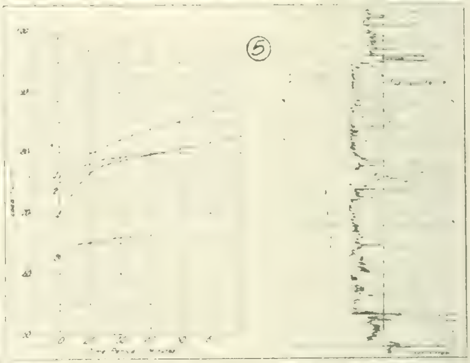
[illegible] of the demand meter at the time of the [illegible] valley on an actual factory load.

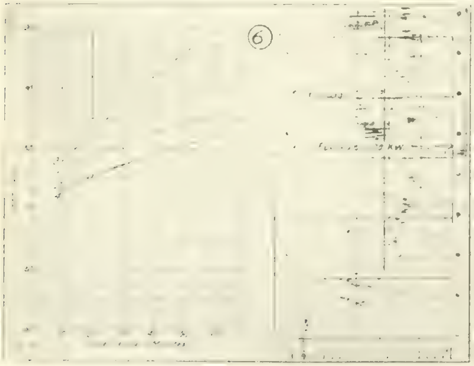
The portable panel carrying the demand meters and a curve-drawing wattmeter, was wired up to the metering circuits of several types of load, and careful records were taken of the indications. These records were averaged for each meter over several days, and the averaged readings











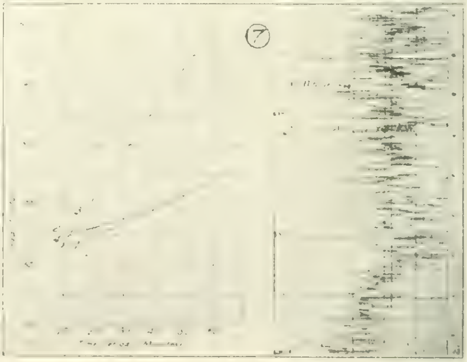


Fig. 2.—Simultaneous charts from continuous recording demand meter and curve-drawing wattmeter. Fig. 3.—Load of Electrical [illegible]. Fig. 4.—Load of rubber manufacturing plant. Fig. 5.—Load of small machine shop. Fig. 6.—Load of brass rolling mill. Fig. 7.—City tramway load.

[illegible] C/3.

[illegible]

expressed in the form of curves as shown in Figs. 3 to 7.

Since demand is one of the elements entering into the computation of load factor, and since the values of demand may vary widely according to the method of determination, it must necessarily follow that the value of load factor is subject to the same wide variations. But the latter quantity, being a ratio, and independent of the magnitude of the load, may be used in comparisons with much greater felicity than may the actual values of demand. The curves, therefore, are expressed in terms of load-factor plotted against time period, a separate curve for each type of meter and a separate set of curves for each class of load. The numbering of the curves is the same as the vertical arrangement of the meters on the panel, viz.—1, logarithmic; 2, block-interval; 3, mechanically lagged; 4, true arithmetical average. With each set of curves is shown a sample of graphic wattmeter chart from the same load. In the load factor calculations, the average power for the day is taken as the average over only that time during which the load curve maintained its particular characteristic nature.

Fig. 3 shows the values obtained with the meters installed upon the total load of an electrical testing laboratory. In this case the load was fairly steady all day, the peak occuring late in the afternoon, due to the additional power required by the lighting circuits.

Fig. 4 illustrates the curves obtained from the load of a large rubber manufacturing plant. This was a continuous 24-hour load with a deep noon valley.

The curves in Fig. 5 were obtained upon the feeder to a small machine shop, whose load included two heavy freight elevators. These are responsible for the severe swings above the day's average. This load is included in the load referred to in Fig. 3.

In Fig. 6, are seen the results obtained with the load on a heavy brass-rolling mill. Here are found numerous and heavy swings, both above and below the average for the day.

Fig. 7 shows the curves from a city tramway load; the section investigated operating from fifteen to twenty cars. The load curve shows, even during the hours of peak load, frequent depressions approaching the zero value.

It will readily be understood that these investigations might have been carried out indefinitely upon a great variety of typical load curves; but the results obtained on the five loads which were examined, indicate that a particular case must be made of almost every installation, and that attempts to generalize or to classify would be productive of little valuable information. Owing to the diverse nature of the results of the several tests, such facts as could be considered typical of the load curves or of the meter types can be presented only in a more or less disconnected way; and, as such, appear in the following summary.

Summary—Part III.

1. Except upon the most fluctuating loads, the demand meters of one type, and of differing time periods gave indications which, generally within the limits of accuracy of the individual instruments, were in close agreement with one another.

2. The load factors as determined from day to day upon the one connected load, by a meter of one time period, differed more widely than did the values determined by the several meters of that type, upon one day's run.

3. The values of load factor as determined from readings of meters of the Merz, (or block-interval) type were found to be very erratic; and even when averaged for the one load over several days, very difficult to reconcile into a smooth curve. A higher value of load factor (i. e. a lower peak) was usually shown for the short periods, coming into approximate agreement with the true value of the arithmetical average, as determined by the continuous recording meter, as the time periods became longer. This phenomenon is doubtless due to the frequency with which these meters would trip in the middle of a peak, thus missing the period during which the demand was a maximum.

4. The mechanically lagged type of meters showed, generally, a comparatively wide range of indications with differing time periods; but the magnitude of this range was very subject to the secondary characteristics of the load curve. With loads whoses value frequently swung well below the average for the day, the long period meters tended to give low indications, and, consequently, high load factors; while, with loads having frequent upward swings, the reverse was usually true. Consequently these meters would sometimes show indications below the average for the day; and in several cases, on widely fluctuating loads, the 60-minute meter of this type gave load factor values of over 100 per cent. This feature is due to the fact that the timing mechanism is operative only during increasing deflections; and, upon a decrease of load below the point corresponding to the position of the wattmeter element of the instrument, this element, quite irrespective of the time period of the instrument, instantly follows the load to its minimum value; and can only climb back again as permitted by the escapement.

5. The load factor, as determined by the logarithmic meters, varied, even on the most fluctuating loads, only a few per cent., between the shortest and the longest time periods.

6. With load curves wherein the peak occured early in the day, the power having been off or very low, during the night, the logarithmic meters tended to give readings lower than the true arithmetical peak, giving a higher value of load factor, the discrepancy approximating the difference in reading which might be expected from the "90 per cent." clause in the definition of their time period. But when the peak came late in the day, after a long-continued run, the load factor as given by the logarithmic meter approached the arithmetical load factor, and in some cases acquired a lower average value. This is consistent with the heating of electrical apparatus.

Conclusions

It is manifestly impossible to arrive at any set rules governing the selection or operation of methods or apparatus for the determination of an empirical quantity. Consideration must be given to a variety of local conditions, which, in all probability, would not be duplicated in any two power systems. It is practicable, therefore, to give as conclusions to this study only a number of deductions which will be quite evident to a student of the subject; together with suggestions as to ways and means of overcoming some of the difficulties which have heretofore presented themselves.

1. In the determination of demand it is not feasible to obtain a quantity which will fairly represent all the factors to be taken into consideration. It is probable that the most logical quantity will be found in the volt-amperes of the load.

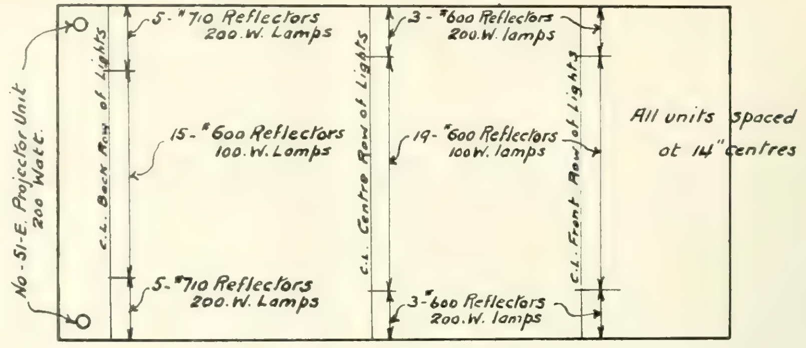
2. Values of "sustained peak," as determined from the charts of graphic meters are frequently misleading and of little significance.

3. Values of averaged or integrated peaks are difficult to measure on graphic meter charts, and are subject to a large personal error.

4. Readings of the Merz or "block interval" type of meters, though in themselves very erratic, will, in the long run, average more closely to the arithmetical average than the indications obtained by any other method.

5. Individual readings of the logarithmic meters are more consistent, and usually closer to the true value of the arithmetical averages than are the individual readings of the Merz meters.

6. Since heating follows a logarithmic, rather than an arithmetical law, it would seem, where heating is being taken into consideration, that the logarithmic average is fully as justifiable as the arithmetical for a basis of demand measurement.



Diagramatic Plan View
Showing location of Lighting Units in Court.

Night Illumination of Racket Court Successfully Treated

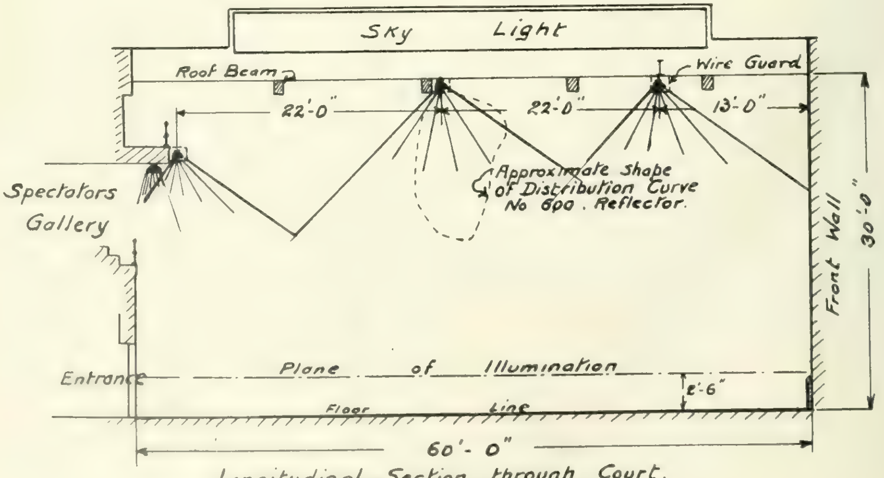
Recreation and Games Formerly Limited to Daylight Now Possible in Evenings

With the modern improvements in illumination, artificial lighting systems are now used extensively in connection with athletics, and recreation can now be taken in the evenings where formerly in certain sports it was limited to the daylight.

Even sports requiring quick and accurate vision can now be successfully carried out under artificial lighting and Rackets is a game which comes under this category. Rackets being an indoor game is usually played during the winter months when the days are shortest, hence the development of a successful artificial lighting system is of immense advantage to a game of this character. Recently successful lighting systems have been installed in racket courts, one of the most recent being in the racket court at the Montreal Racket Club, 16 Concord Street, Montreal.

The racket court is a room 60 ft. long, 30 ft. wide, and about 30 ft. high, daylight being obtained through a large sky light in the roof. The floor and walls of the court are finished with a composition resembling cement which is practically black in color. The racket ball which is small and extremely hard, travels at a high speed and a very perfect system of illumination is required.

The installation at the Montreal Racket Court consists of a total of 77 lighting units. There are three rows of lights, each row consisting of 25 units, and in addition are two flood lighting units, one suspended above each of the rear corners of the court. The front row of lights is suspended 13 ft. from the front wall, the middle row approximately 35 ft. from the front wall and the back row about



Longitudinal Section through Court.
Showing Relative Positions of Rows of Lights

3 ft. in front of the back wall. The flood light units are suspended 18 inches from the rear corners of the court. The front and middle rows of units are approximately 30 ft. from the floor, while the back row and flood lights are some 7 ft. lower.

The installation in detail is as follows:

Front row—25 No. 600 X-Ray reflectors, 6 of which are equipped with 200 watt lamps; these 6 units are located three on each end of the row, the remaining units being equipped with 100 watt lamps.

Middle row—The equipment of this row is exactly similar to that used in the front row of lights.

Back row—This is also made up of 25 lighting units. At each end of the row are 5 No. 710 X-Ray reflectors equipped with 200 watt lamps, the remaining 15 units being No. 600 X-Ray reflectors, equipped with 100 watt lamps. The two flood lighting units are No. 51-E X-Ray projector units equipped with 200 watt lamps. Mazda type "C," 110 volt, lamps are used throughout.

The lighting is controlled from an 8-circuit distributing cabinet situated in the spectators' gallery at the rear of the court. Wire guards are provided for all the units.

The total connected load is 10.1 kw., which works out at approximately 5.61 watts per square foot of floor area. The foot-candles intensity of illumination increases gradually from about 10 in the front of the court to as high as 25 in the two rear corners, on a plane 2 ft. 6 in. from the floor.

The type of the reflector used throws the majority of the light flux downward and towards the front wall. The front, side and rear walls are well lighted and the system is very successful, giving a well diffused light. Shadows are practically eliminated and a pencil if stood vertically on the floor of the court throws no perceptible shadow.

The installation was made by Messrs. Collyer & Brook, 131 St. Alexander Street, under the supervision of Mr. Alexander Wilson, consulting engineer, 136 St. James St., Montreal.

Demonstration of Electrical Devices Should be Up to High Standard

In demonstrating washing machines experience proves that the best results are obtained when a demonstrator — preferably a woman—is in charge. It is not enough that the machine is placed in the window, and the power turned on and then left to operate, trusting to mechanical motion to do the rest. An electric washer is not a talking machine. The dealer must remember that his appeal is to human beings, and must assume the attitude that the average prospect knows very little, if anything, about a washing machine, therefore the necessity of having someone on hand to explain what it will do, and better still, give a practical demonstration of clothes washing. Recently the writer was attracted to an electrical dealer's store by a crowd of children gathered about the door. On investigating it was discovered that a washing machine was in operation. The lid of the machine had been taken off, and a thick layer of soap suds had gathered on the top, making it impossible to see the interior workings of the machine. The children were gleefully dipping their hands into the soap suds and throwing it about all over the sidewalk and entrance to the store, which naturally did not add to the appearance of the place. Several women stopped, looked at the machine—which showed they were interested—and then passed on. Why did they pass on? Because there was nothing to feed their interest. They saw the machine; they saw the soap suds, but there is nothing interesting about soap suds in themselves. Any housewife can make soap suds. It would have been much better had the inside of the machine been visible for her inspection. Doubtless the minds of these women were full of questions, but there was no one to answer them, and so they passed on. No doubt had a good woman demonstrator been in charge of the exhibit, she would have held the interest of these women and as a result drawn others to the spot, and by creating the right atmosphere she would have melted the barrier of reserve and gotten her hearers interested enough to express the ideas in their minds, and to ask questions, so that even if she had not sold a machine, she would have sent them away feeling they had been given service. Of course, it is true, one cannot always have a demonstrator on the spot; but at such times, experience would seem to suggest that the machine should be left in operation, with the top off, but without the use of soap suds—unless the machine is in a window and cannot be interfered with by children—and a few neat silent sales cards, appropriately placed, bearing some practical suggestions and arguments. An announcement could also be placed near the machine stating when the next demonstration would take place, and that all questions would be courteously and intelligently answered. In this way it might also be suggested that a special demonstration would be put on for anyone interested, if they would be good enough to step into the store and make their desire known.

Westinghouse Enters the Wireless Field

An important development in the electrical industry is the entrance of the Westinghouse Electric & Manufacturing Company into the wireless field. Though prior to the war this company was not commercially interested in wireless, it had devoted a great deal of attention to radio phenomena, and during the war it not only carried out extensive researches for the Government, but also manufactured a large amount of apparatus for military use. It is, therefore, well-equipped to assist in developing the immeasurable scientific and commercial possibilities of this new art; and the addition of its resources to those already engaged in this line of work will undoubtedly benefit the entire industry. The Westinghouse Company will be interested in both the manufacturing and the operating branches of wireless telegraphy and telephony. A separate factory has been equipped at East Springfield, Mass., for the manufacture of all types of modern radio apparatus, from the largest transmitting and receiving sets required by trans-oceanic stations to the small sets used by the amateur. Apparatus will not only be supplied for the well-known land, sea, ship, airplane, military and naval services, but special attention will be paid to the development of new uses, such as, for railroads, power companies, mines, lumber camps, ranches, and farms, and for inter-works communications of large industries.

Toronto Section A.I.E.E.

The Toronto Section of the American Institute of Electrical Engineers have already had three interesting meetings this autumn, one of which was addressed by Professor Culver, on the subject of "Wired Wireless," on which the Professor has been doing a great deal of research work. The third meeting was held on the evening of Wednesday, November 10, in Hart House, and partook chiefly of the nature of a "get-acquainted-and-fun" meeting. Following a few introductory remarks, the section chairman, Mr. F. R. Ewart, feeling, doubtless, unequel to the occasion, asked Mr. S. E. M. Henderson to take the chair, and the fun started. Songs were sung, speeches, more or less impromptu, were delivered, motion pictures of the Chippawa Development and other things were shown, and a set of problems, specially prepared by Mr. W. P. Dobson, of the Hydro Laboratories, kept the boys busy for some time. The meeting was voted a great success.

The Electric Christmas Sto

A List So Varied, Attractive and Universally Utilitarian t
plied. Electric Equipment is Attractive in Appearance, He
Delight of Children, the Companion of Middle Age, the
so Great a Variety at Prices Which at the Same Time

Electric Toys, Novelties and Decorations

Aerial Swing
Aeroplane
Animals, electric eyed
Automobile
Circuit breaker
Crane and hoist
Dynamo
Electric boat
Electric engine
Electric questioner
Electric range
Elevator
Electrically operated dog house
Experimental laboratory
Fan
Ferris wheel
"Fun" motor
Gas engine
Hydro-electric generator
Lamp post
Locomotive
Merry-go-round
Motor
Motor and Countershaft
Power station
Railway Outfit
Steam engine and dynamo
Telephone
Thriller magneto
Train
Transformer
Trolley car
Water power plant
Book on electricity
Electric top
Picture and Post Card Projector
Magic lantern
Motion picture machine
Shock coil
Battery
Battery lantern
Flashlight
Dark room lantern
Lantern attachment (battery)
Illuminated pads and pencils
Pistol flashlight
Bicycle lighting outfit
Canoe lamp
Electric candle
Christmas tree lighting outfit
Christmas tree lamp reflectors
Bird, fruit and nut lamps
Miniature incandescent lamps
Electric scarfpin
Battery fan
Battery motor
Chalk eraser cleaner
Corn popper
Horseshoe magnet
Magnet charger
Telegraph instrument
Wireless telegraph instruments
Tool kit
Baby flatiron
Nursery light

Electric Conveniences and Luxuries

Alarm clock
Battery lantern
Bed lamp
Candlestick
Chair lamp
Chimes and Bells
Cigar lighter
Comb and curling ironer
Curling iron
Curling iron heater
Desk companion
Desk fan
Desk lamp
Electric fountain
Electric watch charm
Electrically lighted wall mirror
Electrically lighted table clock
Flashlight cane
Flashlight umbrella
Floral decorations
Flower basket
Foot warmer
Hair drier
Hair waver
Hand lantern
Heating pad
Illuminated pads and pencils
Illuminated table ornament
Library lamp
Luminous switch plate
Massage vibrator
Novelty electric candle
Oil lamp attachment
Ornamental bird cage
Ornamental fan stand
Ornamental pendant cluster
Perfumer
Piano lamp
Portable radiant heater
Reading lamp
Reed or wicker portable
Reminder clock
Shaving mirror
Shaving mug
Silk hat iron
Silk lamp shade
Talking machine motor
Talking machine record light
Traveler's iron
Traveler's Companion
Traveler's stove
Traveler's lamp, cord and plug
Vest pocket flashlight
Watch case flashlight
Writing desk lamp

the Modern Santa Claus

Wants of Every Man, Woman and Child are Readily Sup-
Every Walk of Life, Appreciated by Young and Old, the
of Declining Years. Nowhere Else Can the Buyer Find
eal Value and Yet are Within the Reach of Everybody.

Electric Household Labor Saving Devices

- Bell ringer
- Bath heater
- Boiler
- Broiler
- Cereal cooker
- Casserole
- Chafing dish
- Chocolate and Cream warmer
- Churn
- Clothes drier
- Clothes washer
- Coffee mill
- Coffee percolator
- Coffee set
- Combination cooker
- Cook stove
- Corn popper
- Cream whipper
- Dish washer
- Disc stove
- Disinfector
- Drink mixer
- Egg boiler, cooker or steamer
- Egg set
- Egg tester
- Electrically heated faucet
- Fan
- Fireless cooker
- Flat iron
- Food carrier
- Food warmer
- Fruit juice extractor
- Fruit and vegetable peeler
- Frying pan
- Fumigator
- Gas lighter
- Griddle
- Grill
- Hand lamp
- Hot closet
- Hot plate
- Ice cream freezer
- Illuminated porch number
- Immersion electric heater
- Ironing machine
- Kitchen power unit
- Lemon squeezer
- Meat chopper
- Meat slicer
- Milk warmer
- Plate warmer
- Radiator
- Rain alarm
- Range or stove
- Refrigerator
- Regulating lamp or socket
- Sauce pan
- Serving table
- Sewing machine motor
- Sewing machine portable lamp
- Stew pan
- Sterilizer
- Table cooking set
- Table lamp
- Tea ball pot, kettle or urn
- Tea wagon, electrically fitted
- Toaster
- Toaster-stove
- Utility motor
- Vacuum cleaner
- Waffle iron
- Water purifier

Electric Fittings for the Automobile

- Battery lamp
- Clock
- Foot warmer
- Lamp kit
- Lock
- Signal bell
- Signal lights
- Trouble lamp
- Cigar and pipe lighter
- Electric horn
- Electrically heated gloves
- Engine and radiator heater
- Garage and tire pumps
- Garage portable lamp
- Headlight dimmer
- Headlight glare diffuser
- Headlight voltage regulator
- Hydrometer for battery testing
- Inspection lamp and magnet
- Limousine annunciator
- Limousine cluster light
- Limousine telephone
- Limousine radiator
- Pocket testing meter
- Signal gloves
- Spark plug
- Spark plug intensifier
- Spark plug tester
- Steering wheel warmer
- Spotlight
- Storage battery
- Storage battery tester
- Vulcanizer

Electric Accessories for the Sick Room

- Bath cabinet
- Bed lamp
- Body, joint and limb bakers
- Candle or night light
- Deodorizer
- Ceiling clock
- Electrically heated blanket
- Electrically heated cap
- Electrically heated garment
- Electrically heated pillow
- Foot warmer
- Heating device
- Heating pad
- Mechanical exerciser
- Medical battery
- Medical coil
- Medicator
- Milk bottle or food warmer
- Motor chair
- Nurse signal
- Obesity apparatus
- Sterilizer
- Therapeutic lamp
- Treatment apparatus
- Vibrator
- Violet Ray apparatus

The Contractor-Dealer

Prominent Electric Retail Firm Follows Unique and Effective Method of Educating the Public to the Uses of Electrical Appliances

One of the obstacles in the path of electrical contracting, and one that has too often been accepted as a necessity, is the insufficient provision for outlets in the construction of the average home. The electrical industry—manufacturer, jobber, central station, contractor, dealer, and the electrical press—have planned, and worked, and "sweated" to educate the man in the street and his wife at home to use electrical appliances of all kinds; to percolate, to heat, to toast, to wash, to sweep, to cool, to curl, etc., by electricity, and then when the consumer sets out to do these things, lo, he finds out, like a certain man in an old fable, that he will have to buy a new house to fit the furniture.

That the inexperience of the architect in electrical matters is largely responsible for this state of things is no doubt true. The average architect does not appreciate the importance of making liberal provision for outlets in wiring a house. He almost invariably makes the mistake of cutting the bill for electrical work down to the minimum, not that he desires to do the contractor an injustice, but through a mistaken viewpoint—through ignorance. But this ignorance is costly, not alone to the contractor, but to the owner of the house, for it means expensive alterations later on, and to the architect himself, because it reflects unfavorably on his ability and foresight. Only ignorance could dictate a policy that on a house costing $10,000 the contract for electrical work could be covered by $100 to $150, when in reality it should be at least $500.

If, then, we admit that the condition is due, directly, to the architect, then we must also admit that the responsibility rests primarily on the electrical industry, to educate the architect to the importance of making adequate provision for electrical service in the home.

The realization of this truth has been responsible for the appearance of a little booklet of blueprints and instructions for wiring and lighting of a modern home, put together by Messrs. McDonald & Willson, Ltd., 347 Yonge Street, Toronto, containing a separate blueprint for every room in the house, showing location of receptacles, switches, etc. If any criticism can be made at all of the effort of Messrs. McDonald & Willson it is that they have been too economical in their provision for outlets. The preparation of this booklet, however, is a step in the right direction, namely, towards educating builders and architects in the proper methods of dealing in an intelligent and efficient manner with the problem of wiring and lighting modern residences. For the benefit of our readers we reproduce below the instructions contained in this booklet, the aim of which is given in a foreword on the first page, as follows:

"In building and furnishing a house there is one subject in which the owner should take a lively personal interest, namely, in the wiring and lighting, for upon the lighting the comfort and attractiveness of the home during the evening hours are completely dependent. So many things have to be taken into consideration in deciding upon the wiring; the location of outlets, the height of outlets from floor, etc., concerning which only an expert can give trustworthy advice. With this end in view we have, after a great deal of forethought, prepared the blue prints in this little booklet, showing in a practical way how your home should be wired, and it is with a great deal of pleasure that we are sending it to you. If you require any further information or advice, we would be glad to have one of our experts call and see you at any time."

We give below the instructions for each room, in the order in which they appear in the booklet.

Verandah.

1 centre pendant, or 2 electric brackets.

Hall.

1 ceiling light on two 3 way switches. 1 receptacle for candle sticks. 1 receptacle for suction cleaner and torchere. (Use duplex receptacles).

Dining Room.

1 ceiling light on switch (2-3 way switches at kitchen and hall doors). 4 electric brackets on switch. 1 outlet for electric grate at mantle. 1 receptacle for toaster or percolator. 1 receptacle for suction cleaner (use duplex receptacles). 1 receptacle for candle sticks.

Music Room.

1 ceiling light on switch. 2 electric brackets on switch. 1 receptacle for piano lamp. 1 receptacle for easy chair or Chesterfield lamp.

Living Room.

1 ceiling light on switch. 4 electric brackets on switch. 1 receptacle for floor lamp. 1 receptacle for phonograph or suction cleaner (use duplex receptacles). 1 receptacle near mantel for easy chair or couch. 1 receptacle for electric grate.

Bedroom.

1 ceiling light on switch. 2 electric brackets at dresser on switch. 1 electric bracket at head of bed. 1 receptacle at dresser for curling tongs, massage, or boudoir lamp. 1 receptacle for heater, suction cleaner or fan.

Sunroom.

1 ceiling light on switch. 1 receptacle for lamp.

Bath Room.

1 ceiling light on switch. 2 electric brackets at mirror on switch. 1 receptacle for electric heater or massage.

Kitchen.

1 ceiling light on two 3 way switches. 1 bracket at table. 1 bracket at sink. 1 receptacle (wall) for electric iron, drink mixes, egg beater, coffee grinder or fan. 1 indicating light over iron outlet. 1 floor outlet for electric range. 1 base outlet for electric dishwasher.

Laundry.

1 ceiling pendant. 2 electric brackets. 1 receptacle for washer. 1 receptacle for ironer.

The last page of the booklet contains ten "Specially Important Suggestions" as follows:

1. Make ground floor bracket light outlets 5 ft. 8 in high.

2. Bedroom bracket light outlets 5 ft. 6 in. high from floor.

3. Use duplex or twin receptacles.

4. Have heater receptacles on separate circuits.

5. Whether installing an electric range or not, have service lines heavy enough to take care of this emergency in future.

6. Insist on push receptacles, not screw receptacles.

7. See that laundry tubs are in centre of wall under window, leaving plenty of room to stand and work at either end; also that one cold water and one hot water tap has threaded end for attachment to hose.

8. See that floor drain opening is located in laundry.

9. Ceiling outlet in laundry for attaching electric washer about two feet from front part of tubs and on a line with centre of tubs.

10. See that gas-main entering house from street is 1½ in. pipe, to take care of automatic water heater.

Publicity in the Electrical Field Amply Repays the Trouble and Expense—Mr. Drury's Campaign for "More Business"

No field of commercial enterprise lends itself better to originality in advertising, nor repays that originality more liberally than the electrical merchandising field. It should be the aim of every electrical dealer to exploit the many and varied possibilities of electrical advertising, and thus get the fruits which belong to him. One of the best ways of arousing public interest in your store is by means of contests or competitions. An original example of such methods is outlined herewith in a campaign just launched by Mr. E. A. Drury, one of Toronto's most aggressive electrical dealers. Mr. Drury recently opened up an additional new store in one of the busiest sections of the city, and in order to become acquainted with his constituents inaugurated an advertising campaign, the main features of which were a guessing contest and a boys' sales' competition.

The guessing contest was centered around an electric washing machine placed in the window of his new store. Two of the serial numbers of this machine were covered over, and the public were invited to guess what the numbers were. Cards were given out from the store, on which the contestants were required to write the number of the machine, their names and addresses, and the date. Customers were allowed to guess each time they made a purchase, all others being limited to one guess. This was a splendid incentive towards making customers for the store.

The contestants are divided into three classes—

(1) If the contestant, who is the winner in the contest, is also the purchaser of a washing machine, the prize will be a Premier vacuum cleaner.

(2) If the contestant, who is the winner, is a purchaser of some item other than a washing machine, the prize will be in the form of electrical merchandise to the value of $25.00.

(3) If the contestant, who is the winner, is not a purchaser of any equipment, the prize will be a Majestic heater.

A condition is also attached, however, which places the purchaser of washing machines in a preferred position, for though a contestant in this class may not be the winner of the contest, it is provided that the guesser in this class, who is nearest the winning guess, carries off a prize which is a choice between an electric iron and a toaster.

As a guarantee of the genuineness of the contest, the name and address of the winner of the previous year's contest is printed on each contest card. By a little study of the rules of this contest it will be perceived how they are framed to make the strongest inducement to the public to become customers of the store.

The other feature of the advertising campaign is the boys' electrical sales competition. All boys in the neighborhood, over 12 years of age, are invited to call in at the store and obtain cards, giving particulars of the competition. These cards announce that six cash prizes will be given, only one prize to a competitor, as follows: $25.00 to the boy whose sales are greatest in excess of $100 for the two weeks duration of the contest; $10.00 to the boy whose sales total second highest in excess of $100; $10 to the boy who first sells $100 worth of goods; $10 to the boy who first sells a vacuum cleaner or electric washer; $5.00 to the boy whose sales total third highest in excess of $100, and $5.00 to the second boy selling a vacuum cleaner or electric washer.

Mr. Drury's object in featuring this competition was a three-fold one. First, it was an opportunity for the boys of

(Continued on page 48)

NEW STORE — 161 Danforth Ave.
HILLCREST 5098 W **164 OAKWOOD AVE.**

DRURY'S ELECTRIC SHOP

Second Annual

GUESSING CONTEST

THE *Time Saver Electric Washer* in the window has two of its serial numbers covered: Tell us what they are and we will give one of the following prizes:

If the winner purchases a Time Saver Electric Washer between Oct. 23rd and Dec. 23rd 1920, A Premium Vacuum Cleaner, **Value $57.50**

If the winner is a customer, Electric Merchandise . . . . **Value $25.00**

If the winner is a contestant only, a Majestic Heater, ... **Value $11.50**

In the event of the prize being won by a person who is not a customer, we will give to the purchaser of a Time Saver Electric Washer who guesses nearest to the correct number, their choice of any Electric Iron or Toaster in the store.

The prize shall go to the first person who guesses the correct numbers. A person other than customers, shall be limited to one guess. A customer shall have the privilege of guessing with each purchase.

Please Fill in with INK

We have received from:

Name ....

Address ....

Time..............................Date..............................

Our prize last year, the Time Saver Electric Washer was awarded to Mr. Cober, 73 Oakwood Avenue.

The contest closes at 9.30 p.m. Dec. 23rd 1920

The number of washer is..............................

Name ....

Address ....

Time..............................Date..............................

NEW STORE — 161 Danforth Ave.

Christmas Trade Waits for You to Make the First Move.

Suggestions for Window Backgrounds

Make "Stop, Look, Listen" the Aim of Your Window Displays. Your Window is Your Magnet. Is it Strong Enough to Draw People Right In to Your Store?

By F. S. Beaumont

[If the store window is worth [illegible] per cent of the whole store, as was stated before the last meeting of the Toronto Contractors & Dealers, then it behooves every electrical dealer to pay special attention to his window trim. An attractive window is paramount at Christmas time when all the retail trade is competing for the extra holiday business, and it is hoped the suggestions contained in this article will prove of timely value.—Editor.]

Suggestion No. 1

In order to give plenty of space for display of Christmas goods, a design has been made for the upper back part of the window, leaving practically all the floor space available for the display of gifts. As will be seen by the drawing, this background can be easily constructed and will show off the appliances to good advantage.

To produce this effect, first, buy three wreaths of a size proportionate to the space at the back of the window. While any make of wreath will do, holly is preferable; or, where desirable, three circular wooden frames can be made and covered with holly.

Next, take two pieces of beaverboard and cut out patterns as shown in drawing in suitable proportion to size of window. The beaverboard can be painted as desired, although white is preferable. Secure these firmly together, trimming edges as shown with gold tinsel or Christmas tree moss.

The centre wreath can be used in many ways. One suggestion is to picture a bust of Santa Claus in it, with a telephone receiver to each ear, connected by graceful lines, representing telephone wires, to the outer wreaths in which appear the figures of a man and woman communicating over the telephone with Santa Claus, who is suggesting electrical gifts. If this is not desirable the dealer can put his own name in the centre wreath and whatever other suggestions he likes in the outer ones. This design offers the dealer a great variety of ideas to choose from.

Next, make a wooden frame the length of your window, 12 inches high, and attach this to another piece the length of the window 10 inches wide. This should be made solid, and when put together will form a shelf upon which can be placed suitable appliances. Before placing appliances on this shelf the upright back for shelf can be covered with cotton batting, sprinkled with glitter to represent snow. On the shelf, as shown in drawing, place icicles, which can be made to desired size, either of a painted canvas drop or long tapering strips of cotton batting. To make icicles of cotton batting dip into solution of gelatin, about as thick as ordinary syrup. When dried they make excellent representations of icicles.

The background under shelf can be made to suit the dealer's own wishes. For example, by placing end to end crepe paper of a brick pattern it can be made to represent a brick wall. In using display stands for appliances cover the stands with cotton batting, forming icicles around the edge, same as shelf. Sprinkle the batting with tinsel powder, or glitter. To make the effect of snow more realistic the glitter can be used with tints of green, blue, etc., which can be accomplished by the use of Diamond dyes.

In placing appliances in window it is always best, after unpacking them, to wrap the boxes with holly paper, placing the appliances on same in window.

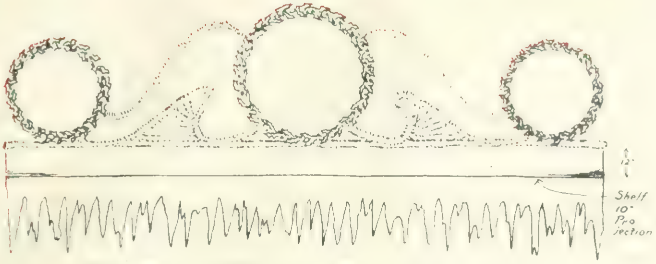
No. 2 Suggestion.

Take two wreaths in proper proportion to the window, leaving a space of approximately one to two feet between each wreath and end of window. Place in centre of window between wreaths a cut-out of Santa Claus. An inexpensive draping to use for this work is wood fibre roping. Run two lines from centre figure to the back of wreaths, allowing the ends to drop in proportion to outside edge of the wreaths.

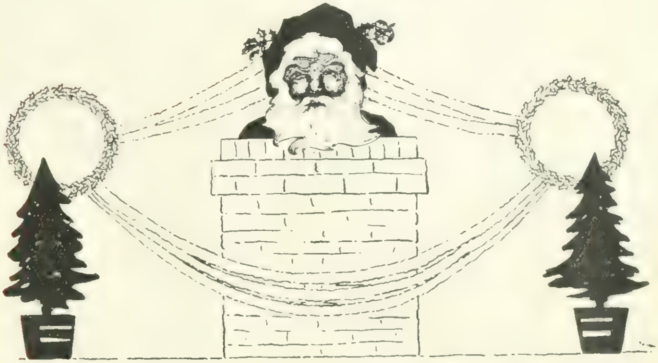
Next, attach three, or as many lines of roping as desired, from lower part of wreath to opposite one. Place in the foreground of the window, at each end, a small Christmas tree in proportion to size of window. On these trees can be used miniature electric lights. All is now ready to place appliances in window, to suit the requirements of the dealer.

Suggestion No. 3.

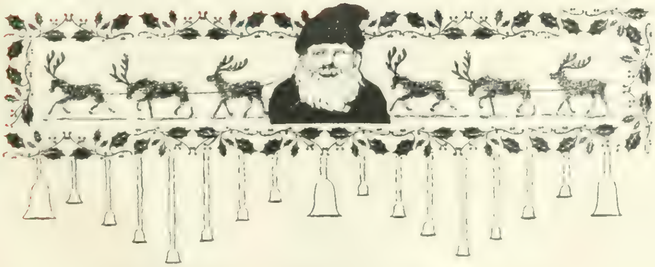
Build up a ridge of beaverboard across the back of the window 12 inches high, and cover with holly. Place in the centre a cut of Santa Claus, and from each side run a line of small reindeer as shown in illustration. If the background is dark, lengths of plain white or silk rope can be hung from the beaverboard with small Christmas bells at the end of each rope. Or the background may be draped with white pleated silk, in which case the rope should be dyed a dark green with red bells. This makes a very appropriate Christmas background and leaves all the window space for the display of appliances.



Window Background for Christmas Display—Suggestion No. 1



Window Background for Christmas Display—Suggestion No. 2



Window Background for Christmas Display.—Suggestion No. 3

154 Oakwood Ave.
Phone Hill. 5098.

161 Danforth Ave.
Phone Gerr.

DRURY'S ELECTRIC SHOPS

BOYS' ELECTRICAL SALES COMPETITION

SIX PRIZES:

One	$25.00
Three	$10.00
Two	$ 5.00

$25.00 to the boy whose sales are the greatest in excess of $100 for the two weeks from Nov. 15th to 29th at 6 p.m.

Second Prize: $10.00 to the boy whose sales total second highest, providing they exceed $100.

Third Prize: $10.00 to the boy who first sells $100.00 worth of goods.

Fourth Prize; $10.00 to the boy who first sells a Vacuum Cleaner or Electric Washer.

Fifth Prize: $5.00 to the boy whose sales total third highest, providing they exceed $100.

Sixth Prize: $5.00 to the second boy selling a Vacuum Cleaner or Electric Washer.

Only one prize to be won by any contestant.

OBJECT:

To give boys a chance to earn money after school hours.

To enable a boy to develop his talent as a salesman, that he may know what selling is before leaving school.

To advertise my line of Electrical Washers and appliances to the public.

SIX PRIZES:

One, $25.00 Three, $10.00 each
Two, $ 5.00 each

Every boy gets paid for his actual work: $1.00 for every $10.00 worth of goods he sells. In some cities many boys have sold $50.00 worth in a day.

ELECTRIC SALES COMPETITION.

Name
Address
Age Phone No ....
School ....

I desire to enter your sales competition, and would, if chosen, report to you on Monday, Nov. 15th, at 3:00 a.m. and continue to do as requested by you, selling until Nov. 29th.

I have read conditions on attached form and agree to abide by them.

(Continued from page 45)

the district to earn money after school hours; second, it would tend to develop the sales instinct in the boys before leaving school, and lastly, it introduces him to his constituents by advertising his store and his goods. One of the terms of the competition is that the boy should obtain the consent of his parents to enter the campaign. This is done [illegible] On the back of this stub is printed the guarantee, which the parent is required to sign, and which is worded as follows: "I am the parent or guardian of the above named boy and am agreeable to his entering the competition, and will be responsible for his honesty and good attendance." The front of the stub bears the application of the boy himself, giving his name, address, age, 'phone number and the name of the school he attends. The conditions of the agreement are embodied in the following: "I desire to enter your competition, and would, if chosen, report to you on Monday, Nov. 15th, at 8:00 a.m., and continue to do as requested by you, selling until December 23rd. I have read conditions on attached form and agree to abide by them."

Mr. Drury has chosen a unique method of advertising, and one that cannot fail to link up his business with the homes and interests of his constituents.

Christmas Selling Campaign in Full Swing

The Christmas selling slogan, "Say Merry Christmas Electrically," has jumped into popularity almost over night. This is the slogan being spread broadcast by central stations and electrical merchants taking part in The Society for Electrical Development Holiday Campaign.

The society has conducted many campaigns in the past, but from present indications this 1920 Christmas drive promises to eclipse all previous selling movements. As in previous campaigns, the society supplies a certain amount of advertising material free to its members. Non-members, however, are required to pay the actual cost of producing and distributing the material which they may want to use. On November 15th Society Headquarters reported that they had already received more cash in payment for campaign advertising material than they received either during "Electrical Prosperity Week" or "America's Electrical Week," the two biggest national campaigns ever inaugurated by any industry.

It has already been necessary, so the society reports, to order new supplies of several of the dealer helps. Nevertheless, there is still time for those who have not yet taken advantage of this campaign to get their material and there is also an opportunity for those who underestimate their requirements to get additional supplies of advertising folders, window cut-outs, poster stamps, etc. People are going to spend money for Christmas presents this year as always but the electrical industry has many competitors. If the electrical merchant would get his share of this profitable Christmas business he must go after it aided by every logical means of publicity. The Society for Electrical Development, whose headquarters are at 522 Fifth Avenue, New York city, will help. Write directly to the Society for the material you want—but do it quickly.

Keep Windows Free From Frost

During the winter difficulty is sometimes met in keeping window glass free from frost in freezing weather. This can be overcome by proper ventilation, which will keep the air temperature in the window the same as the outside temperature; if the heat from your heating plant is dry enough, there will be no moisture in the air to condense and freeze on the window. If the foregoing conditions cannot be met, an electric fan can be placed in the window, and in this way the moisture condensing on the glass will be evaporated by the breeze quickly enough to prevent the forming of frost.

Another remedy is to clean the glass thoroughly and then rub the inside surface with a chamois or soft cloth dipped in a solution of one ounce of glycerine in a pint of alcohol (denatured alcohol will answer the purpose). A little amber oil can be added to improve the odor; the solution should stand till it clears.

Harmonize Your Window With the Spirit of the Holiday Season by Using

Christmas Window Decorations

Make It An Electrical Christmas—Let "Say It Electrically" be the Slogan—A Few Suggestions That Can be Developed to Suit Individual Preference

By A. E. Edgar

It is surprising how quickly the public responds to sentimental appeal, not only in politics, religion and human affairs, but in business, as well. The electrical dealer, who through his windows, best presents this appeal, will secure the greatest response.

Christmas is a great sentiment. It means more to some people than to others, but is universal in its general appeal. By symbolizing this great sentiment in his windows, the electrical dealer will produce an affinity and relationship with the great buying public that will mean more sales.

Make Your Windows Reflect the Christmas Spirit.

The merchant is the great Santa Claus of the world. If he did not prepare for months in advance for the extensive Christmas business that resolves itself into individual gifts for the millions, there would be little Christmas giving on this important anniversary. Remembering this he should also make his windows reflect the spirit of the day and bring pleasure to as many as possible while at the same time, he brings money into his own coffers.

Christmas windows are at once the easiest and the hardest to decorate attractively. They are easy to decorate because of the vast amount of material that can be used in securing a pleasing attractiveness. They are hard because it is no easy thing to secure original effects.

We present in Fig. 1 a holiday window setting that is easily prepared from inexpensive materials, yet contains many of the accepted symbols of this great event. The setting can be made in a window that has a permanent background as easily as in one without it. In fact, the permanent background can be made the foundation upon which the setting is built. This background may consist of the usual polished wooden panels or of a drape made of silk or plush. In case there is no background to the windows, panels of wall board may be erected to which the decorations may be attached.

A platform is set up in the centre of the window to give that part of the display more prominence. This may be omitted, or the shape and proportions changed to suit the window of any store.

Two narrow panels are set up on each side of the platform. In front of these are placed cut-out Christmas trees in conventional design. These can be cut out of cardboard or wall board. The tree should be colored green, the box any color desired, red being appropriate. In place of the cut-out, a similar design might be painted on the panel.

In Fig. 2, we show a decoration that could be used to replace this tree cut-out. It is a huge imitation holly leaf cut out of green cardboard with a winter scene painted on it by the show card writer or sign painter. The snow can have frosting added to give it a pleasing glitter in the light. This winter scene could be made to include a Santa Claus, driving his reindeers, or arriving by airplane just as the fancy dic-

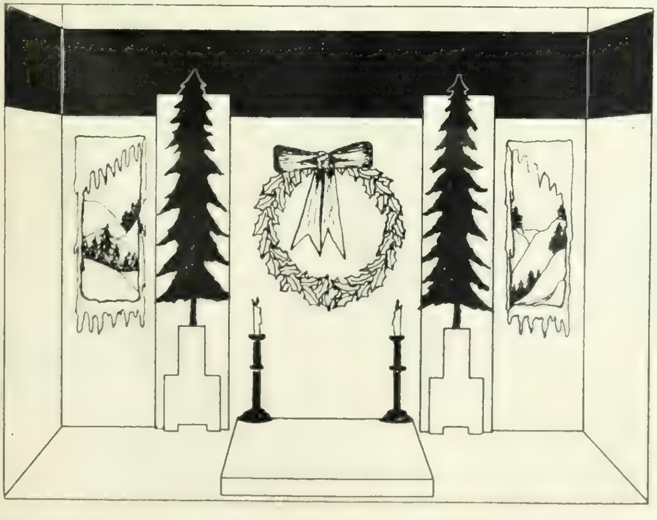


Fig. 1—A simple but effective setting for Christmas window trim

[illegible] is adopted, the winter paintings [illegible] panels of [illegible] had better be omitted. These [illegible] first painted on boards and attached to a wooden stand. [illegible] cotton batting with the strands rolled to imitate icicles, and covered with a thin sprinkling of artificial snow will be quite effective.

In the centre of the background a large holly wreath tied with an immense bow of bright red ribbon is hung. Below two candles are shown. These may be actual candles in silver or ornamental candlesticks or cutouts, which any painter [illegible]

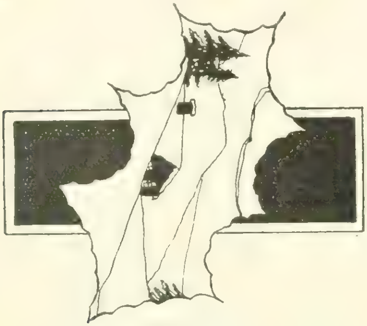


Fig. 2

Introducing Santa Claus.

If Santa Claus is desired for a window attraction this holiday setting can be changed to admit of this. The centre panel can be reduced in height, and the centre part of the top hollowed out to give more space for the figure. In Fig. 3, we illustrate a chimney with Santa Claus rising out of it. This can be painted on wall board to form a cut-out. A more effective decoration would be to have an actual chimney and a figure of Santa Claus emerging from it.

The chimney can be built of boards and covered with imitation brick paper. Crepe paper and fancy papers can now be purchased printed in brick patterns. In case this cannot be secured locally the chimney may be covered with red paper, or cloth, and the mortar lines painted on, or laid out with white tape. The projecting ledge at the top [illegible] cotton batting representing icicles.

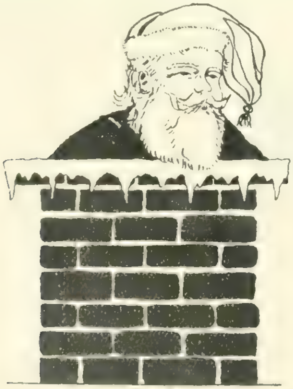


Fig. 3

The Santa Claus can be made by using a false face with [illegible]

[illegible]

shall be, but where there is plenty of space the panel should be placed about fifteen inches in front of the permanent background and the chimney and Santa Claus set in the space behind it.

The background illustrated in Fig. 4 is simple but effective. Many electrical dealers will prefer not to have too much decoration in the window. This setting will serve these dealers very well. At each corner of the window are placed two narrow panels with the intervening space filled with one large panel. The top edges of all three panels are hung with imitation icicles. The narrow panels have evergreen wreaths hung near the top, while the centre panel has a Christmas scene. The picture could be framed with a wreath of evergreens if desired. Any suitable picture may be substituted for the painting, such as a large picture of Santa Claus or any Christmas scene that may appeal to the window dresser.

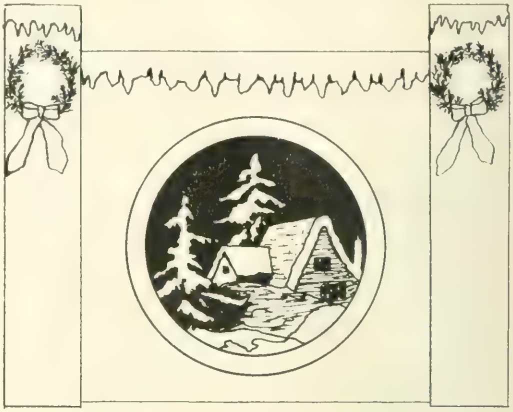


Fig. 4.

An electric dealer in a western city had a snow man in his Christmas window that attracted a great deal of attention from the younger generation. It was built in regulation form, see Fig. 5, the huge snow balls being represented by balls of cotton batting. An old battered silk hat was perched at a rakish angle on the head and a red scarf tied around the neck. He bore a standard with the inscription "Merry Christmas."

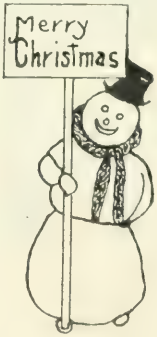


Fig. 5

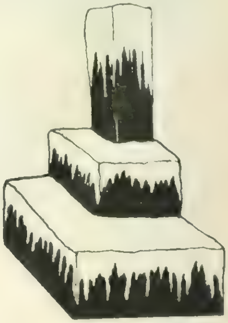


Fig. 6.

In another window, one corner was fitted with graduated shelves or steps. They were first covered with red cotton, the tops being covered with cotton batting to imitate snow. The illustration in Fig. 6 gives a good idea of how the steps looked when completed.

The Christmas window with the spirit of Christmas lacking will hardly get a look-in while other windows are symbolizing the great joy of the occasion. A few minutes spent in preparation will produce the most pleasing decorations and attract much favorable attention and business for the store.

Gen. Mitchell Will Arbitrate

Arrangements have been completed between the Ontario Government and the Toronto Power Company whereby the latter supplies approximately 15,000 horse-power of electric energy to the customers of the Hydro-electric Power Commission of Ontario at a price to be determined by an arbitrator. Brig. Gen. C. H. Mitchell, Dean of the Faculty of Applied Science and Engineering of the University of Toronto, has consented to arbitrate the matter.

Municipal Engineers' Convention

The Association of Municipal Electrical Engineers of the Province of Ontario will hold their regular winter convention this season on January the 27th and 28th in the city of Toronto. The programme includes a get-together supper in the Carls Rite Hotel on the evening of the 27th and the following programme: "Economic handling of range and heater loads on distributing systems," by C. E. Schwenger, Toronto Hydro, and "Engineering features of the Chippawa Hydro-electric development," by T. H. Hogg and E. T. J. Brandon; this subject will be illustrated; "Examination, test and approval of electrical appliances and apparatus," by W. P. Dobson, head of the Strachan Avenue laboratories of the Hydro-electric Power Commission of Ontario. Some time during the convention arrangements will be made for the delegates to visit the Strachan Avenue sub-station and laboratories. Detailed information will be mailed at a little later date by the secretary of the association, Mr. S. R. A. Clement, Hydro-electric Power Commission of Ontario, University Avenue, Toronto.

Winnipeg Electric Store Sets High Standard

The articles which have appeared in recent issues of the "Electrical News," illustrating and describing several electrical retail stores, show conclusively that there is a fast growing tendency on the part of the electrical dealers in this country to make their business a real factor in their respective communities. As a further example, it is a pleasure to publish a view of the Sibbald Electric Co., Ltd., 601 Portage Ave. West, Winnipeg. Mr. Sibbald, or "Billy," as he is known to a very wide circle of friends, is the owner and manager. He started in the contracting business early in 1915 and gradually built it up until, in the spring of 1918, he found it advisable to open a store.

Mr. Sibbald is assured of a successful future because he believes in such business-building fundamentals as a good location, neat and orderly store appearance, good window, adequate stock of electrical appliances and household goods —all of which are of the best quality. He also does a large contracting business and is not only a competent business man, but possesses a genial disposition and is very popular with the trade and respected by his competitors.

Don't Throw Cold Water on Your Patrons' Ideas. Give Your Imagination Free Play

Catch the Customer's Enthusiasm

Be on the Alert to Make Suggestions that will Improve and Amplify the Customers' Ideas—Show that You Understand the Meaning of the Word "Service"

Customer: "I have a little metal Indian figure at home that I wanted to convert into a decorative lamp. I had it bored for wiring, but I find that it will require a special socket. I understand there is a miniature socket I could get suitable for the purpose. Have you any in stock?"

Saleslady: "No, we have none in at present. We will have some in shortly."

Customer: "I have been wanting to get this done for some time now. Do you think you could fit it up for me?"

Saleslady: "Yes, I think we could. Some time when you are passing you might bring the lamp in with you, and we will see what is to be done to it."

"That's a pretty fixture there," said the customer, pointing to an indirect bowl fixture with hammered brass fittings. "What's the price of it?"

"The price of that is $22.50. Cheap, isn't it?"

No immediate response.

"We require something like that for our best room, only it would require to be closer to the ceiling. That hangs too low."

"You wouldn't like this one here?" said the saleslady, pointing to a fixture of similar design, but different finish.

"No, I prefer the other, if I could get it taken up nearer to the ceiling. Do you think it could be done?"

"I believe it could. You might call in some time, when you are passing and see Mr. Blank and explain to him what you want."

"Very well, I will perhaps do that," and a moment later the customer was gone.

Lost Opportunities

Here we have a word picture of the average sales clerk in the average electric store. Several opportunities were offered for real service. The lady had an ornament which she wanted to convert into a lamp. Now that was something interesting. It showed the customer to be of a creative turn of mind. She wanted a neat little socket to fit that neat little lamp. Who knows but what she was secretly planning to have this lamp all fixed up and spring it as a surprise on the family at Christmas. The clerk should try to catch the enthusiasm of the customer and never let up until the object is gained. It was unfortunate that the necessary size sockets were not in stock, but an attempt should have been made to give a definite statement as to when they would be available. The customer was evidently anxious to get it done. It had apparently been on her mind for some time, and she was just asking to be relieved of it. Would it not have been ever so much better to have said: "Yes, Mrs. so and so, we believe it can be done, and we'll send over for the lamp just as soon as possible. We can no doubt get the necessary socket for it and fix it up for you complete." That's what the customer was really asking for. She may never bring in that lamp, or may drop the matter altogether, or, worse still, take it somewhere else. If the clerk had caught the spirit of the customer she would have kept right after that little Indian figure until the transformation was complete and the customer entirely satisfied.

Now, with regard to the fixture. It is scarcely ever wise for a sales' clerk to refer to the price of an article as being cheap. When it is desirable to bring out this feature it should be done by way of suggestion, or by comparison with some other type of fixture. Price is a question that should generally be kept in the background and dispatched with brevity. It is service you are selling, not price.

Don't Suggest "No"

Again, only the average sales clerk says: "You wouldn't like this?" Never ask a question in the negative. It would have been much better to have said: "Here is a fixture of similar design, but of different finish, would that suit?" Or, "here is a fixture of similar design that is in popular use in the better class homes. How would you like that?"

Lastly, rather than leave the initiative with the customer, it would have been much better to have arranged for the proprietor to call at the customer's residence, where he could have formed a better idea of what was required, and perhaps made several suggestions for improving on the customer's scheme, and incidentally made the lady feel she was getting real service; that here was someone who knew his business, and was ready to place his knowledge at her disposal. The sales clerk should always take the lead and keep it right to the end until the job is done—namely, when the customer is satisfied.

From the Big Department Store We May Learn a Lesson of

Better Electrical Merchandising

Locate the Store Carefully, Make It Inviting and Then Tell the People What You Have and What It Will "Do" for Them

By E. S. Dunham*

First, let us consider retail selling, the selling of general merchandise. We will single out the department stores because they represent the best practice in retailing and because they are going to be your biggest competitors. There are 3,800 department stores in this country. They do a business amounting to a billion dollars a year.

How do they do it so successfully? Can they buy so much cheaper than you? No. Is their overhead so much lower than yours? Evidently not. The secret of their business is in:

A—The Volume.
B—Quick turn-overs
C—Proper merchandising.
D—Advertising.

All four of these items are interrelated. Proper merchandising means buying and offering goods that the customer wants. It creates volume. Quick turnovers are secured through advertising, etc.

Now the department store gets 90 per cent, of its business from women. The merchandise manager is always looking for something he can sell. He is offered some electric irons, buys them and holds a sale in his housewares department. It goes well, so he buys a few more for regular stock and hunts up some fans for a sale and they in turn do well; so he takes a flier in chafing dishes and curling irons. Pretty soon he has a small stock of miscellaneous electrical goods, which are segregated and a new department is formed.

The point to be seen is that the department store wants just as much of your business as is profitable to them, the part that can be handled without increasing the overhead expense to any appreciable degree. The department store is getting this business from the electrical store because:

A—The electrical appliance is in its infancy.
B—The electrical store is not inviting.
C—The electrical store is not well located.
D—The electrical store does not advertise.

Item 1 is a known truth and needs no discussion; item 2 and 3 apply generally—in other words the average electric store is partly a shop, with men in shirt sleeves; and the average electrical store is not in the woman's path. Other specialty stores seeking women's trade locate themselves between department stores.

Item 4 is what concerns us. In a vague way the woman knows that there are factories that make electrical goods. She might name some of them or else she might acknowledge having heard of the General Electric, Westinghouse, Robbin & Myers, Western Electric and others, but she has no particular interest in them.

You will remind me now that these great concerns have spent millons of dollars for advertising and you will ask me where the results are. Let me say in reply that the woman customer has not bought enough electrical goods as yet to realize that there can be a difference in grade. She has absorbed the advertising all right, wants an electric iron, or cleaner, or washer, but is not concerned as to the maker. The recommendation of her favorite store is her guide. And the very fact that a reliable store offers to sell her an electric cleaner is enough for her.

Followed Customers

The woman customer is a creature of habit. She has her favorite store for everything that she buys frequently. I happen to know the case of a department store that studied its trade. First they put out clockers to count the customers that came from north bound and south bound cars; also those on foot. Then they followed customers through the stores, and learned that some customers bought hosiery one place and gloves another; that they came in and made a bee line for the housewares department, for instance, and didn't see another thing. The owners began to shift locations of departments and to sell more goods.

Now here is where Item 4 comes in—that electrical stores do not advertise. I wish to say that this means the average electrical store. The average electrical store runs "announcements" in the paper. An announcement is not necessarily an advertisement. Women read advertisements—if they contain news of merchandise. News to them means information as to use and price. They want specific information as to the convenience and comfort or labor saving points and they want to know "how much?" Contrary to your ideas they buy more goods at regular prices than at cut prices.

But you are handicapped. You cannot afford a full page ad every day of every week. And still you must get attention. To get that you don't have to use a page or a half page, though you will find a little ad almost worthless unless designed as a reminder. Save up your space and use it in sizes large enough to command attention. Off hand I'd say 3 columns by 8 inches and up. Then write your ad to sell goods.

Use an illustration of the goods, not an illustration of a small boy ringing a bell and crying "Hear Ye." If you want to sell an electric cleaner, put a picture of it in the ad and start right out saying "this cleaner does this, etc." or "This Western Electric cleaner will do this, etc." State the price, or at least the approximate price. If it be a small article like a night lamp, display the price boldly, if a larger device, washing machine for instance, let the price come in small type as a part of the small text matter, but display the terms of payment if offered on divided payment plan.

Edit Manufacturers' Copy

Take advantage of the ready written advertisements that the manufacturers offer, provided they are adapted to your locality. It is unfortunate, however, that some manufacturers for the most part located in the north, direct such advertising wholly to northern people. Down here a few white women do their own washing. Up country many do. Electrical washing machines have sold in large numbers in the south this year because so many "wash ladies" failed to live up to promises. But that's getting away from the subject. Usually the advertisement provided by the manufacturers can be

---

*Before Tennessee State Convention.

[illegible] and thereby produce results, unless the illustrations are wrong.

Right here I'll remind you that the north uses shortening made from cottonseed oil, and the south demands hog lard. Probably this condition will exist as long as the biscuits [illegible] as actually made by your cook.

Attract the Customer.

[illegible] creates the desire to have certain electrical goods and directs the prospective owner where to buy them. Since the electrical store is to a large extent a foreign country to most women, it should be the proprietor's ambition to attract these customers as frequently as possible. Therefore the selling of fans and cleaners on time payments will serve the double duty of making profit and regular customers at one time.

In the store use the counter displays furnished by manufacturers of specialties. Change the windows frequently, you can't do it too often. Since most of the goods you sell are used in the home, work out some homelike effects, and this is important, don't try to show too many things at once. One floor lamp is better than two—and put a price tag on it. Borrow a talking machine from another store, borrow a small rug and an easy chair elsewhere, then on a small card say "Victrola loaned us by Houck's" "Rug and Chair loaned us by Jennings."

Keep in mind that the show window is your best advertising medium. If you don't believe this, compare the rentals of stores on various streets. Rental values are based upon the number of people passing. By the same token a store on the second floor is a poor location. Cost of doing business at retail in this or any other city rises if all stores are on one street, because foot traffic centers them in a few blocks. The best way to reduce rents is by re-routing street cars and thereby squaring up the foot traffic. Banks and movies also preempt the best corners and locations.

Use Local Newspapers

Your next best advertising medium is the newspaper. It is the only medium you can use that your customer pays out money to read. It is read by the whole family and its contents discussed. It permits the use of illustrations and takes your messages everywhere. Use it liberally and frequently but don't run an ad in it just because you feel you should. Rather than fill the space with just anything, omit the ad.

On the other hand, it isn't hard to prepare a selling advertisement if you will only stick to the facts and remember that the headlines should tell the story. Study the front page of any newspaper and you will find that the important fact is told in the headlines, the most important detail in the subhead, the gist of the whole story in the first paragraph, and then if the item be truly important, the whole thing is retold point by point in the succeeding paragraphs.

Frequently I have heard advertisers raise the objection of repetition. Repetition is a necessary quality of a good advertisement. It is emphasis. In personally selling over the counter one can emphasize important points by modulation of the voice and repetition. One can modulate the voice of advertisement by means of varying the type size. A peculiarity of it is that emphasis can be attained by dropping a paragraph into a type smaller than the size of the body matter and setting it in a narrow measure. Italic type also contrasts and can be used for emphasis.

Tell the Whole Story.

Brevity, however, is greatly desired in all except mail order advertising and institutional advertising. But brevity must [illegible] fixtures is not nearly as good as to go on and say that this display will contain livingroom fixtures at $15, $20, $25, to $250; diningroom fixtures at $20, $25 to $125, and so on. Give the prospect something to hang his hat on.

Probably it should be her hat, because with the exception of new houses built for sale, a woman is back of the order for new fixtures. And if you are offering reduced price of say 20 per cent. say so and then list some of the prices, such as "$50 fixtures in this sale, $40; $35 fixtures, $28," and so on; 20 per cent. off means something to you, but many women cannot figure it—they are not used to trade discounts.

Seek originality, but don't get the idea that originality is to be had in the actual setup of the ad. In that respect there is nothing new under the sun. By originality I mean something new. For instance in Memphis we see buildings in process of erection, signs—some of them lighted—"Electric Work by Fowler." Then in the newspapers every day a two inch ad which simply reads "Electric Work by Fowler." Now a few of those signs multiply themselves in the public mind to the point where many people think Joe Fowler has the town sewed up tight. Then, too, they see the little ad in the paper possibly three times a week and think it's there every day. This is called "reminder" advertising, and it builds prestige because it stimulates in the public mind the fact that the Fowler Electric Co. does a large contracting business.

One Helps the Other.

Every time the Jones Electric Shop advertises electric washers it makes it easier for the Brown Electric Co. to sell them. When Brown advertises fixtures he helps make sales for Jones. There's so great a volume that can be created that every electrical store can afford to help make the demand. Then why not all join together and so do co-operative advertising?

It has been my good fortune to prepare such a campaign for the Memphis Electric League. The object of the campaign is twofold; that of creating the desire for electrical conveniences, comfort, and labor saving devices; and that of promulgating the truth that it is always best to buy electrical goods at electrical stores. Each advertisement is 50 to 75 inches in size and contains "reason why" copy. It also contains the names of the contributor. No trade marks are mentioned. We say instead, "There are several fans of standard manufacture which electrical stores feel worthy of their guarantee," or "The electrical store avoids goods obviously made to sell." The latter is a point especially emphasized.

We stress the fact that when devices become broken the first thought and act is to take them to an electrical store. Then why not avoid possibility of inferior goods by purchasing standard goods at a store that can furnish renewal parts and make repairs upon short notice?

We state that the electrical store deals only in standard electrical merchandise and materials; that the proprietor himself generally knows each transaction and becomes acquainted with his customers personally; that he knows full well that his customers expect him to protect them from inferior goods; and that his business career is built upon that confidence. These advertisements are unsigned; that is, they do not contain the name of the "Memphis Electric League." They carry "Nineteen Good Reasons Why You Should Buy Electrical Goods at Electrical Stores." The reasons are simply the names and addresses of the nineteen retailers and contractors responsible for the advertisement.

The United States Steel Corporation of Gary, Ind., has voted $291,420 for the work of extending the Essex Terminal Railway from Windsor to Amherstburg to open up the lands near the Brunner Mond Canada, Ltd., and for that of running several spurs into the Canadian Steel plant at Ojibway.

The New Regulations re Luxury Tax

There is apparently a very considerable lack of uniformity of opinion among electrical dealers regarding the Government's revised scheme for handling the luxury tax which went into effect on November 1st.

Briefly, the new regulation requires (1) that every retailer who is selling goods subject to the luxury tax must obtain a retailer's license, and (2) the amount of the tax on every sale made must be affixed to a sales' bill which is presented to the customer, in the form of stamps.

The operation of the new regulation is thus very simple after the scheme is once set in motion, but it is apparent that a number of retailers have not become seized of the requirements of this new regulation. The following brief explanations may be of assistance to those who are still looking for information.

The cost of the retailer's license is $2, and it must be obtained from the Inland Revenue branch in the district. Inland Revenue branches are established in the following towns and cities throughout Canada. Ontario: Belleville, Brantford, Guelph, Hamilton, Kingston, London, Ottawa, Owen Sound, Perth, Peterboro, Prescott, St. Catharines, Toronto, Windsor. Quebec: Joliette, Montreal, Quebec, St. Hyacinthe, Sherbrooke, Three Rivers. New Brunswick: St. John. Nova Scotia: Halifax, Pictou. Prince Edward Island: Charlottetown. Manitoba: Winnipeg. Saskatchewan: Moose Jaw. Alberta: Calgary. British Columbia: Vancouver, Victoria. If the retailer will make application to the nearest district office as above, enclosing the value of two dollars, his license will be forwarded to him forthwith.

Special excise stamps have been printed for affixing to the customer's bills, in denominations from one cent to one hundred dollars, so that any combination of amounts can be made up. These stamps are available at the Inland Revenue offices and at all banks and their branches. Where the regular stamps are not available regular postage stamps will serve the purpose equally well.

It is necessary, of course, to mark these stamps in some way so that they cannot be used again, and the Government has provided a special perforator which the retailer is required to use. This is obtainable from the Inland Revenue office with the license, and without any additional expense. For his own insurance the retailer should be careful to use those perforators, as, in case the stamps are lost from the bill, the holes in the bill itself are some evidence that stamps were originally affixed.

It is absolutely clear that the license is only required to be taken out by a retailer who sells goods subject to luxury tax. Regarding this latter point, i.e., what goods are subject to tax, there has also been a great diversity of opinion, but the ruling of the Department is that, luxury taxes are only collectable on "Piano lamps and stands, table lamps and stands," made of rosewood, prima vera (white mahogany), solid mahogany or ebony or lacquered or decorated," and on "silver or gold deposit ware." This, plainly, is intended to apply only to the more elaborate and expensive lamps and appliances and will only affect a percentage of electrical retailers. Any retailer, therefore, who does not carry any of this expensive equipment is under no obligation to purchase a license or to collect luxury taxes on his sales.

Is the Contractor Being Neglected?—An Interesting Letter from a Prominent Contractor Who Thinks "Yes"

Toronto, Nov. 20, 1920.

Editor, Electrical News:

The question of electrical "merchandising" has been given a very great amount of publicity. Campaigns have been launched and no opportunity to place before the electrical contractor the advantage of selling electrical appliances has been lost. This work has been done exceedingly well. In fact, the interesting addresses we have all listened to, and thoroughly enjoyed, have filled us with ideas and educated us along this particular line, which is invaluable.

Now, why can't the electrical jobbers and manufacturers of electrical material used in electrical contracting get together and proceed along the same lines to educate the electrical contractor—as an electrical contractor—and show [illegible] terial on the jobs, what are the short cuts in the contracting [illegible]

We should then find an electrical contractor understanding the business in which he is primarily engaged, and having a far better understanding of how to conduct his business in a more efficient manner.

Most of the electrical contractors that we know started in business after they had had some experience in the elec- [illegible] have a good working knowledge of the contracting business, as far as wiring goes, and only need instruction in the fundamentals of general business applying to the electrical contractor. If they were instructed along the lines which are directly associated with this business, it would be more beneficial to the industry in general than to instruct them and fill their minds with ideas running along another channel.

Merchandising is a very fine thing for the man who is already conducting his electrical contracting business in an efficient manner, and can handle something else, but most electrical contractors need to handle their own business more efficiently before they touch electrical merchandising.

Take 75 per cent. of the electrical contractors to-day and ask them if they are rated at Dun's or Bradstreet's. No! they are not, and why? Because they either do not conduct their contracting business on such a basis that they know detail costs—they often do not keep books—or they have no rating and will not give information about their business to any one. Why is all this taking place, and how does it come about that it has not been rectified?

I think it is simply a matter of education. What the electrical contractor needs is articles and papers on his business read at the meeting of his association; open discussion on handling of estimates; methods of simple accounting, stress being laid on the fact that overdue accounts represent so much profit lost and just enough system and routine to make it easy to manage. There should always be a monthly statement, showing the amount of business closed, also the amount of time and material spent during the month and a summary of the jobs as they stand.

It would take up too much of your valuable space to go into all the details of the contracting business, but I think Mr. Abbott's very able paper given at Baltimore could be supplemented so that the electrical contractor, who is anxious to benefit from our association, can apply more easily the principles laid down.

I would like to hear expressions of opinion along these lines with a view to benefitting the electrical contracting end, in which I think we need more instruction than in making merchants out of electrical contractors.

Very truly,
E. F. W. Salisbury.

The Hoover Suction Sweeper Company Has Just Celebrated Its Twelfth Birthday—Many Happy Returns!

The Hoover Suction Sweeper Company recently celebrated its "dozenth" anniversary in fitting style. The "Story of Hoover" is one that adds to the romance of the history of twentieth century inventions, manufacture and merchandising. Dealers throughout the country have watched the growth and complete success of Hoover; many have shared in it; and although the sales figures, plotted into graphs, might serve as a model for other like endeavors, it is perhaps the harvest of good will and faith that most impresses those familiar with the organization. How Hoover pioneered the electric sweeper idea and how great a part of many retail businesses this article has become, are sidelights.

W. H. Hoover, head of the company with plants in Canton, North Canton (Ohio) and Hamilton, Ontario, wrote the following after the 12th anniversary of the concern had been observed:

"Speaking of the anniversary leads our minds back to the origin of the company in 1908, indeed, we should go back just a little farther when the product, which is the basis of what we are and hope to be, evolved itself in the mind of our lifelong neighbor and friend, Mr. J. Murray Spangler, who unfortunately, was 'called hence' just on the eve of the practical use and marketing possibilities of his wonderful invention being established.

"The manufacture of the machine was originally conducted in a small room in Canton. The first factory space given to it after its removal to New Berlin (now North Canton) was the room now occupied by our Sales School, supplemented by about one-half of the floor next below, with a small room in what was then known as the hair shed of the old W. H. Hoover Company.

"A few lean years followed, caused by the necessity of developing the machine as well as the market for it.

"The development of a sales organization worthy and capable of developing the market for the product has been an interesting as well as somewhat trying experience. When the Hoover Suction Sweeper was first introduced, electric cleaners were an unknown quantity or factor in the minds as well as the homes of the public. No one knew they ever needed or wanted such a device.

"Our sales organization now comprises 80 divisional and district managers, 650 salesmen who give all their time to selling Hoover sweepers to the many prospective customers as well as many hundreds more who devote a portion of their time to explaining the merits of our product.

"As we now contemplate the quality of our product, the size and character of our sales organization, and the thousands of loyal dealers, we feel that our efforts have been fully justified and rewarded.

"In closing, we want to express our appreciation of the character, quality and spirit of the 1,800 loyal people who are working in our factories and offices. It is with pride as well as satisfaction that the prevailing spirit of harmony and co-operation is such as to arrest the attention and meet the commending approval of all who come in contact with the company."

Conditions Evidenced by Attendance at Annual Jobbers Convention in Cleveland, November, 1920

Some Startling Facts Learned—and a Reference to Happenings by the Way

by

One Who Went

Just a year ago the One Who Went this time was also among those present, and remembers vividly that one crowded hour of glorious life spent while awaiting the transportation changeovers in Buffalo. Many faithful Canadian students of plans, good ones and otherwise, who were present on that 1919 trip, will also doubtless recall those two strenuous hours wherein jobbers in Canada mingled with manufacturers and manufacturers with those who only "assembled" just as if they were all equals. For was there not business for all, and more, much more, and was not the buyer by this time educated not to mention a possible order to his closest friend if that friend perchance was a manufacturer? I'll say he was!

So when buyers can't buy
And makers can't make
Let's hang the goose high
For there's nothing at stake.

This need not be accepted as the exact wording of the hymn of last year that was sung as we first set forth to buy up Buffalo, nor yet the one as we briskly strode back to the private car which the C.P.R. had kindly placed at our disposal for the journey—at the usual charges—but sing we did and right merry were we, and on the following morning a Quebec delegate refused to believe the party over, insisting that he couldn't find his boots. The recovery of the boots of this distant jobber from the berth of a Toronto manufacturer caused no friction at all, because all present felt that even with conditions as they were then, no electrical manufacturer would wilfully deprive an electrical jobber of his boots. The maker of a wild suggestion that the supplier had tried in this way to prevent the buyer following him and worrying him further about deliveries was very promptly and properly sat upon.

Ah, them was the happy days! Is there then a change —In one short year! You tell 'em phonograph, you've got the record!—In 1920. No private car, no busy brigade buying Buffalo by night, but as said by one Tom Hood, and somewhat paraphrased:

No merry drum did roll or beat
The jobbers glad tattoo
Nor did we meet on a Buffalo street
That frolicsome jobber crew;
Stayed each on his own stamping ground
Stock sheets around him spread
And did regard with solemn mind
Big profits long since dead.

No! This time, before turning in for the night, while waiting at Buffalo, business matters were thrashed out and our minds cleared of doubt on certain points by discussion which, at times, grew almost animated and were referred for settlement quite frequently to the well-known international arbitrators—Little Phoebe and Big Dick. Their decisions were delayed sometimes by passing Box Cars. These discussions were of necessity terminated somewhat early for the gentleman of color who had the whisk-broom concession was so interested in the proceedings that no passenger could go to bed until their close.

The jobbers delegation from Canada with two assistants occupied one Drawing Room. The One Who Went was awake and dressed betimes and set about routing out this delegation to the 1920 Annual Jobbers Convention and found him disposed to slumber. We made convention headquarters, performed our matutinal ablutions, breakfasted and looked again for the Annually Convening Association of Non-Price-Cutting Jobbers. We studied the programme and dismissed the matter as merely a happenstance that the convention was to be addressed, lectured and cajoled by manufacturers entirely, excepting one, a banker. Incidentally one of the most startling statements made in one of these informative addresses was that "ninety-seven per cent. of all who start up a business in the electrical field fail in ten years."

And shortly came the rollcall which brought forth another fact significant reflecting conditions all too clearly. The Annual Jobbers' Convention was attended by 75 jobbers and 426 manufacturers. Did the manufacturer slip coyly behind the telephone girl when he saw the jobber approaching this time? Ah, no! Conditions now apparently indicate the need of the breast pocket bulging with 50-cent Havanas, and heavy demand is again reported for Cohen's old-time home-made Hebrew joke book. Mr. Jobber ought per chance yet to listen to reason if properly handled, and at the worst, how could a jobber or anybody else, cancel an order if as soon as his mouth was open it was fixed that way by the quick insertion of a 6 in. long x 1 in. O.D. conduit coupling pure Havana filler, guaranteed slow burning—probably weatherproof? So, many a mouthful of cigar prevented many a cancellation and the overstock still stuck. And will stick unless that race of gipsies in the electrical business. the commission agents (who are 90 per cent. out of the 97 per cent. above mentioned maybe) will help out. And much of the 50-cent cigar overflow went in this direction we understand. For, while much has been said during the years of plenty anent the doing of business through regular channels according to the Bridge principle (Blackstone, Bloodstone or Moonstone, we forget which), many's the fevered brow of manufacturer and jobber, which is pleasantly cooled to-day by the efficient ministrations of these disciples of one Matthew "who sat at the receipt of customs" (in our language, "commissions"). We recall (to delve into history, and asking pardon for the digression) that in a similar overproduction dilemma centuries ago the Queen of Sheba shipped a pile of her overstock to Solomon who was engaged in the biggest construction work of the age, and labelled it "a free gift." She did a whale of a business with Solly after that and her children's children traded materials for the building he started, for it went on for ages and ages, just like the work on the great Chinese wall and the New Union Station in Toronto. So, instead of cutting prices, why not send sections of material over to Europe for the rebuilding of France and Belgium, and make it "a Free Gift" with the compliments of Electrical Canada. They'll appreciate it over there, and incidentally get wised up to the real way of making and using advanced electrical materials before the little fellow gets there with the imitation.

Maybe, Oh, great Canadian jobber, the consideration of these few notions will bring to thee the light of a great wisdom, and thou shalt yet flock with thy kind as thou didst in 1919 and never again leave one and one only to speak for thee at the Annual Pow-Pow around the camp fires of the Big Chiefs as in this year of the cool summer and the mild green fall, when the pelt of the beaver is cheap and fuse plugs are sold for a cent.

And so the jobbers' delegation from Canada found life becoming hourly more strenuous and despite protestation superimposed upon protestation by the manufacturers an end was made to it all by a blind rush for the train home. Too full of chicken leg, chicken breast, oysters, Havanas and Old Crow for much speech, the delegation to the 1920 Annual Convention stood on the Pullman car step and, waving an arm to still the throng (like Patti might have done on her 19th farewell tour), he said: "Boys! for Heaven's saks say it with flowers" and overcome with the pathos of it all he sought him his berth and slept in his clothes. The One Who Went climbed pensively upstairs, one tier nearer the stars, undressing full of thoughts and ponderings an' everything. One long yawn, one last smile at the strange ways of jobbers with Old Crow and the events of this earth plans were lost in oblivion.

December 9

The regular monthly meeting of the Toronto electrical contractors will be held on Thursday evening, December 9th, instead of on December 2nd as previously announced. Mr. George Cross, live-wire chairman of the Attendance Committee, is working hard to insure a bumper attendance. Dinner will be served at 6.30 and the members will afterwards be addressed by Mr. Frank R. Ewart, on the subject "The Electrical Contractor From the Engineer's Standpoint."

At this meeting also the officers for 1921 will be elected, and members are requested to give the matter the necessary thought beforehand.

Canadian Scientist Wins Prize

The Lieut.-Colonel Libermann Memorial Prize, consisting of the interest for 1919 on $10,000 and awarded for the best work of the year in progressive discovery tending toward the advancement of radio, has been awarded to Roy A. Weagant, consulting engineer of the Radio Corporation of America, for his discovery on the elimination of static interference. This prize, founded by a friend of Lieut.-Col. Libermann, who was killed in action leading his troops in France on August 8, 1918, was awarded for the first time to Leon F. Fuller, chief engineer of the Federal Telegraph Company a year ago.

Mr. Weagant, honored this year, is a native of Morrisburg, Ontario, Canada. He was educated at Stanstead College and McGill University. He studied physics under Sir Ernest Rutherford and first became interested in wireless through witnessing some of his experiments in Hertzian waves. He took up commercial wireless work in 1908 and in 1918 entered the employ of the Marconi Wireless Company of America. He soon rose to the position of chief engineer and when the Radio Corporation of America absorbed the Marconi Company he was retained as consulting engineer. Mr. Weagant is a fellow of the Institute of Radio Engineers and a former member of its board of directors and standardization committee.

The Benjamin Electric Manufacturing Company of Canada, Limited, are distributing an interesting folder entitled "The Benjamin Convert-A-Cap with Adjustable Blades." This adjustable blade idea is a new one which enables you to fit the cap into either a parallel, a tandem, a single "T" or a double "T" slot.

Current News and Notes

Esk, Sask.

Tenders are called for the construction of an extension to the Warren Rural Telephone Company's lines to the extent of about six miles. Plans and specifications are in the hands of the secretary-treasurer of Esk, Mr. Dan Triske. All bids must be in the hands of the secretary-treasurer by January 1, 1921. Tenderers must furnish labor and material.

London, Ont.

The Public Utilities Commission of London, Ont., are making preparations for the increased demand for Hydro that is expected to follow the completion of the Chippawa development. A new transformer station will be built at Kitchener Ave. and Cabell Street to serve the industries of that district. The estimates for next year's extensions will include $80,000 for the Waterworks Department and $125,000 for the Electrical Department.

Montreal, Que.

Mr. J. J. Valois, 444 Durocher Street, Montreal, has been awarded the contract for electrical work on four residences being erected by the Greater Montreal Land Investment Co., Limited.

Messrs. Philip Lahee & Co., 3 St. Nicholas Street, Montreal, have been awarded the contract for electrical work on $258,000 school being erected in Montreal by the Protestant School Commission.

Messrs. Electrical Maintenance Co., 262 St. George Street, Montreal, have been awarded the contract for electrical work on $250,000 clothing factory being built by L. A. Dubrule, 455 Philips Place, Montreal.

Messrs. R. S. Muir & Co., 32 Park Avenue, Montreal, have been awarded the contract for electrical work on $15,000 office and store being erected by J. O. Bourcier at 16-24 Victoria Square, Montreal.

Messrs. Vincent & Say Electric Company, 351 Union Avenue, Montreal, have been awarded the contract for electrical work on $30,000 alterations to residence at 366 Peel Street, Montreal.

Ottawa, Ont.

Mr. Stan Lewis, [illegible] Metcalfe Street, Ottawa, has been awarded the contract for electrical work on Nurses Home for Ottawa Isolation Hospital.

Owen Sound, Ont.

The Toronto Electric Co., 101 Duke St., Toronto have been awarded the contract for electrical work on $100,000 theatre being built at Owen Sound by the Superior Theatres, Limited.

Peterboro, Ont.

The Peterboro town council recently adopted the railway committee's report recommending that the street railway fares be increased from five to seven cents, with four limited tickets for twenty-five cents, same to go into effect on December 1st.

Regina, Sask.

Supplementary estimates for the year ending April 20th, 1920, amounting to $2,055,680, have been passed in the Provincial Legislature. The largest single item is $500,000 for construction and other work of the department of telephones.

Sherbrooke, Que.

The Wiggett Electric Co., 71 Wellington St., Sherbrooke, have been awarded the contract for electrical work on fifty residences being erected by the Sherbrooke Housing Co., at an approximate cost of $450,000.

Sydney, N. S.

The Mackay Electric Co., Charlotte Street, Sydney, N.S., has been awarded the contract for electrical work on $90,000 church being erected on George Street, Sydney.

Toronto, Ont.

The Dominion Bridge Co., Limited, have been awarded the contract for five large penstocks by the Hydro-electric Power Commission of Ontario, for its Queenston plant. One service penstock is also included in the contract. The large penstocks are from 14 to 16 feet in diameter, and the metal is 1⅛ inches thick. The contract calls for early erection, since a part of the plant must be in operation by September of next year. Over 2,000 tons of steel are involved in the contract.

The Patterson Electric Co., 43 Fermanagh Ave., Toronto, have been awarded the contract for electrical work on public school at Leslie St., at an estimated cost of $840.

Vancouver, B. C.

Messrs. Farr, Robinson & Bird, 546 Howe St., Vancouver, have been awarded the contract for electrical fixtures on $60,000 institute buildings being erected by the Chinese Nationalist League.

Westmount, Que.

At a recent meeting of the Westmount City Council it was decided to purchase 4,000 feet of cable and a power house switchboard for the lighting and power department.

Windsor, Ont.

Messrs. McNaughton & McKay, 45 Pitt St. West, Windsor, have been awarded the contract for electrical work on $80,000 business block being erected at Windsor by Mr. E. N. Bartlett.

Winnipeg, Man.

Messrs. McDonald & Willson Lighting Co., 309 Fort St., Winnipeg, have been awarded the contract for electrical work on medical college being built at Winnipeg by the University of Manitoba.

The Star Electric Co., 191 Portage Ave., Winnipeg, have been awarded the contract for electrical work on $90,000 addition to the Grain Exchange on Lombard St., Winnipeg.

* * *

The Louisville, P.Q., Light, Heat & Power Co., Limited, has been incorporated to acquire the assets of the Compaigne Electrique de Louisville, Limitee, to carry on the business of electricians, engineers, and manufacturers; and to purchase, generate, and supply electricity. Authority is also taken to acquire water powers in the counties of St. Maurice, Berthier, and Maskinonge. The capital is $99,000.

Obituary

The Robbins & Myers Company announce the death of Mr. Adam Shoop Tarr, manager of their Philadelphia Office, from typhoid fever.

James W. Bell, vice-president of the Wagner Electric Manufacturing Company of St. Louis, and one of the pioneer capitalists of the electrical industry, died at his home in St. Louis, November 4th, at the age of 94.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

Published Semi-Monthly By
HUGH C. MacLEAN, LIMITED
THOMAS S. YOUNG, Managing Director
W. R. CARR, Ph.D., Editor
HEAD OFFICE - 347 Adelaide Street West, TORONTO
Telephone A. 2700

MONTREAL - - 119 Board of Trade Bldg.
WINNIPEG - - - Electric Ry. Chambers
VANCOUVER - - - - Winch Building
NEW YORK - - - - - 296 Broadway
CHICAGO - - Room 803, 63 E. Adams St.
LONDON, ENG. - - 16 Regent Street S. W.

ADVERTISEMENTS
Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS
The "Electrical News" will be mailed to subscribers in Canada and Great Britain, post free, for $2.00 per annum. United States and foreign, $2.50. Remit by currency, registered letter, or postal order payable to Hugh C MacLean, Limited.
Subscribers are requested to promptly notify the publishers of failure or delay in delivery of paper.

Authorized by the Postmaster General for Canada, for transmission as second class matter.

Vol. 30 Toronto, December 15, 1920 No. 24

Reserves, in Finance as in War, are for Use in Emergency

What is the difference between success and failure? One man is easily beaten, another fights best when his back is to the wall.

Why did Britain emerge victorious from the world war? Because when the enemy looked strongest and his attitude was the most arrogant and confident, the British soldier simply gripped his teeth tighter, shortened his belt, raised a cheery song and fought on with irresistible determination.

Finally, what can cause, in Canada, a bad trade depression with unemployment, poverty and anarchy in its wake? Nothing in the world but fear, hesitation and lack of confidence in ourselves.

What we think, we are. To fear we're beaten is to be beaten. To lie down in the path is to be run over.

But, it is not characteristic of the Britisher either to fear or to "lie down," when there is a difficult task to perform.

We are to-day face to face with a formidable enough army. Against us are arrayed a reduced local demand for our manufactured articles, a condition of high money rates, adverse exchange, increasing imports and falling exports, unemployment, and a universal restlessness that is a heritage of war. Shall we funk it? Shall we raise the old cry, "Sauve qui peut"—"each man for himself"—and run for cover? Or shall we do it the British way—shoulder to shoulder?

Let us look the situation fairly, honestly, in the face. The war years were "fat" years for many of our industries. There is no denying the fact that larger profits than average were almost universal. No doubt, too, in their wisdom, considerable reserves were built up by our industrial managements. What for? Why, the rainy day, of course, the "hard times" that every business man knows is the inevitable backwash of a surge of prosperity.

Here, we take it, is the kernel of the situation, however. What is the function of this reserve? Is it to "hide" behind in fear and indecision, or is it to arm and victual ourselves with while we fight and conquer the opposing forces. Surely it is the latter.

Financial authorities who have written on current and immediate future conditions during the past year tell us that a panic in industry is always of the people's own making. A panic simply means "turning and running away." They say that if we stand to our guns there will be no panic.

Which is it to be? Shall we stand fast or shall we turn and run? Shall we keep our industries going on their built-up reserves so that the nation may benefit by the turnover, or shall we bury it in a hole in the ground for safe-keeping, and let panic and anarchy run its destructive course?

The answer lies to-day with the captains of industry of our country. Next year may be anything—it will be what we make it. If we "funk" we are headed, perhaps, for the biggest crash in our history, but if we conduct ourselves according to the British standard, if we tackle our job as our soldiers fought in Europe, the storm can easily be weathered and 1921 will see us forging ahead again.

What are you going to do with your reserves? Hide behind your "pile" or use it to further your own and your country's prosperity?

Definitely Easier Money Predicted for 1921

Perhaps the best indication of the prospects for 1921 is the condition of the money market, and readers of the "Electrical News" will be pleased to know the opinion of Mr. John Moody, a recognized financial diagnostician of New York. Mr. Moody addressed the Board of Trade of the city of Toronto a few days ago and predicted that the United States would enter the year 1921 with the prospect of definitely easier money. He stated with every assurance that commercial paper would drop from 8 per cent. to 6 per cent., and call money will drop to 4 per cent. by May, and perhaps even to 3 per cent. or 3½ per cent.

Regarding the trend of prices Mr. Moody gave it as his opinion that during the next ten years we are likely to have a tendency towards lower commodity prices, but he cautioned his hearers that we have climbed a long way since 1914 and that it is just as far down as it was up. In consequence he thought the deflation period may extend over some years. There did not appear to be any doubt in his mind, however, but that eventually we should reach the same price level as obtained previous to the world war. In expressing this viewpoint Mr. Moody is simply affirming what students of past history have already pointed out, namely, that every great war has been accompanied by a rapid and very marked inflation of prices and followed by a slower deflation to a point almost identical with that from which the rise took place. For example—and just as an isolated case from many—we have before us the index numbers of wholesale commodity prices in the United States over the period affected by the Civil War of 1866. In 1860 the index number stood around 77, and this had increased in 1866 to 190. A sharp decline is noted then to 120 by the end of 1871, and finally to 70 in 1878. In this case it required a period of 12 years before prices regained their former level. It is more than likely that in the year 1866 there were those who predicted that future prices would continue at a higher level, just as they are predicting to-day. The history of the wars of the past, however, have never shown this to be the case, and it seems a natural conclusion that in from 10 to 12 years, if not before that time, the average prices of our staple commodities will have dropped to the same index number from which they began to move up in 1914.

One factor that has to be considered, however, in making comparisons with the past is that the much more complete system of communication and transportation of modern times is likely to accelerate the rate of deflation. While no one believes or expects that the old prices will be reached again in the immediate future it is still possible that we may divide the deflation period following previous wars by, perhaps, two and count on standing on rock bottom again in five to six years after the signing of the armistice, that is in three to four years from the present time.

Manitoba Strong in Natural Resources

On Thursday, 25th of November, the Manitoba Electrical Association held their fortnightly luncheon, which was well attended. J. M. Leamy, Power Commissioner of Manitoba, delivered a splendid address, his subject being "Some of Manitoba's Natural Resources." He stated that Manitoba could hold its own, as far as water power was concerned, with any other Province in Canada. Manitoba has great agricultural and mineral possibilities, but in his opinion its power resources would figure as much in the development of the Province as anything else. There are nine power sites on the Winnipeg River, two being developed amounting to 381,000 h.p. and the ninth being situated on the Winnipeg River in Ontario, 26 miles below Kenora, Ont. This can be developed to a capacity of over 50,000 h.p. In other portions of Manitoba there is 100,000 h.p. available from streams tributary to Lake Winnipeg including the Saskatchewan River. The Nelson River in Manitoba which is the outlet of Lake Winnipeg into the Hudson's Bay, is estimated to contain 2,000,000 h.p. making a total of over 2,600,000 h.p. for the province. This shows 4.2 h.p. per capita on Manitoba's population of 600,000. Comparing these figures with those of the United States, Manitoba can boast of 18 times the amount of h.p. per capita that the United States has.

Dr. Arrhenius, Nobel Institute of Sweden, claims that England and Germany must eventually become agricultural countries, solely because their present sources of power will become exhausted. He estimated that the coal areas of Canada will last for 1,500 years while those of England, France and Germany will be exhausted in 200 years. Mr. Leamy says this will bring a movement of population to the Western Continent that may commence much earlier than might be expected, in fact during the last 50 years the immense immigration from Europe may have had its origin in this factor of power as much as in any other of the many impulses that were behind it. The National immigrations have many causes that are obscure and unknown to even those people participating in them. The following figures will give an idea of the available water power per capita of a few of the European countries: Norway, 2.4 h.p.; Sweden, 1.0 h.p.; Germany, 1.50 h.p., and Great Britain, ¼ h.p. Canada ranks well to the fore with 2.2 h.p.

The time will come when power will become as necessary to the community as water is at the present time. "Power is the mainspring of modern activity" but should not be abused; meaning that it should be an article of local utility rather than an object of barter. If power were sold at cost or thereabouts we could expect to see great activities in the Western towns, as it would mean greater development, bigger opportunities and more comfort for the population. Where power is, there you will find the people gathered; without power no manufacturing or industries can be carried on.

In conclusion Mr. Leamy stated that it is estimated that, in Eastern Provinces about $600.00 worth of electric appliances can be made good use of in the average home and say $1,500.00 worth on a farm, showing thereby the huge field there is for power. After several minutes of hearty applause, an amendment to the constitution of the association was introduced by Mr. Geo. Guy, which will be discussed at the next luncheon.

Mr. F. Miller gave a short address entitled "How an Association can be Run Without the Members Paying Their Dues" which brought forth much laughter. Unfortunately Mr. Miller could not tell his audience how it could be done, nor could any member present throw any light on that point, so it was unanimously decided it was impossible.

The Canadian Fairbanks-Morse Co. presented a handsome reading lamp which was drawn for, the lucky winner being Mr. Wm Raymond.

We extend the
season's greetings and
wish you and those
whose happiness is
yours a full measure
of Christmas joy
and success for the
New Year

"School" Undergraduates Hold Banquet

The 31st annual banquet of the Engineering Society of the Faculty of Applied Science and Engineering of the University of Toronto was held in the Great Hall of Hart House on Tuesday evening, December 7th. The attendance at the "School" this year is almost equal to the record established in the years before the war, being well over eight hundred, and about one-half of these were present at the annual dinner. The head table was graced by Sir Robert Falconer, president of the University of Toronto; Brig.-Gen. C. H. Mitchell, Dean of the Faculty of Applied Science and Engineering, members of the Faculty staff and officers of the Engineering Society. The president of the society, Mr. R. W. Downie, was an able master of ceremonies.

The past history of the "School" has never recorded a more enthusiastic gathering and evidences were multiplied of the cordial co-operative relationships among the undergraduates themselves and between the under-graduates and the staff. No more convincing evidence need be sought of the high standard of the work of this Faculty and of the efficiency with which it is being carried along.

Following the toast to "The King," "The University" was proposed by Mr. A. D. R. Fraser, '21. President Falconer replied and spoke in encouraging terms of the progress of the University as a whole. "The Faculty" was proposed by Mr. A. M. Reid, '23, and Dean Mitchell responded with a brief but inspiring address, referring, among other things, to the great loss sustained by the Science Faculty in the death of Dr. Ellis. "The Profession" was proposed by Mr. J. Roy McLean, '21, and called for a response from Professor C. H. C. Wright. Professor Wright was unavoidably absent, however, on propaganda work for the University, and Professor C. R. Young was a very acceptable substitute. The "Sister Societies" was proposed by S. F. Everson, '22, to which representatives of McGill, Queen's, and R. M. C., responded.

Early in the evening adjournment was made to the gymnasium where "applied science" in the form of boxing and other athletic events further demonstrated the tendency of Ontario's government university towards a broader educational policy.

The committee who had charge of the evening's entertainment and were responsible for the enjoyable programme were as follows: R. W. Downie, president of the Engineering Society; P. J. Culliton, chairman; J. W. Gardner, vice-chairman; E. A. Dunn, secretary-treasurer; C. Dean Maxwell, fourth year representative; S. L. Coulter, third year representative; A. E. O'Brien, mining representative; A. R. M. Dymond, first year representative; L. F. Stokes, civil representative; A. T. O'Brien, mining representative; A. R. Smythe, architect representative; H. A. Knight, chemical representative.

Pulp and Paper Industry Processes Before Electric Club

The members of the Electric Club of Toronto continue to overtax the capacity of the dining room of the Hotel Mossop every Friday at the luncheon hour. In explanation it may be said that the cause doubtless lies chiefly in the excellent addresses that this year's executive is providing. On Friday, December 3rd, Mr. T. L. Crossley described the processes in the pulp and paper industry, illustrating his explanations with lantern slides. The importance of the industry was indicated by figures quoted by Mr. Crossley to the effect that the value of the export business of Canada's pulp and paper mills for the last fiscal year was approximately one hundred and four million dollars, or, as the speaker put it, this industry was helping to correct the adverse exchange conditions to the extent of about $300,000 a day. It was further mentioned that this industry was one of the largest users of hydraulic power, the total requirements running well over three hundred thousand horsepower. More and more this is being applied electrically, individual motor drive now being used in most of the operations in the newest installations

Turbine-Generator Makes Record Run

The 45,000 kw. Westinghouse turbine-generator at the power plant of the Narragansett Electric Lighting Company, recently established what is believed to be a world-record for the continous operation of a multiple-element steam turbine of the cross-compound type, by operating without a shutdown for a period of 84 days, 11 hours, 36 minutes. During this run there were generated 51,104,000 kilowatt-hours. The turbine was operating under ordinary conditions, no preparation being made for the run.

Mr. H. Douglas, accountant of the Canadian Westinghouse Company, Limited, Montreal, died on December 4, after a brief illness, aged 36 years.

More About Electrical Statistics —A Tentative Classification

Montreal, December, 1920.

Editor, Electrical News:—

We note with much pleasure the interest shown by your readers in regard to our letter published in your issue of November 1st last.

Your own comments on the subject, which precede the reproduction of the six letters in our December 1st issue, are well placed, and we believe if those interested in the electrical industry will consider the interests of our industry as a whole, rather than our individual requirements, we will eventually get somewhere in our efforts to build up statistics to the benefit of all.

Dealing with the letters in the order in which they are published, we would say that the proposed classifications mentioned in the letter of the Packard Electric Company, Limited, should be welcomed and added to the list provided by ourselves.

The Conduits Company, Limited, might be advised that we have already taken up this matter by correspondence and personally with Mr. Dustin, the managing secretary of the Associated Manufacturers of Electrical Supplies in New York, and we understand that our letter published by you on November 1st is being used by that association and published in a New York Electrical Journal. Mr. Dustin is of opinion that the arguments put forward and the figures used in that letter apply equally well in the United States as they do in Canada, and already a list of new classifications is being considered by the Chamber of Commerce and the Customs Authorities in Washington.

The Masco Company, Limited, suggest two ways of obtaining what we require, which methods are being partly used at the present time by the officials in Ottawa, with the following exceptions:

The Dominion Statistician sends out questionnaires annually to all electrical manufacturers for returns, but as stated in our previous letter, the full returns for the year 1919 are not yet to hand, which fact will support our contention that the questionnaires are not dealt with seriously by all manufacturers and jobbers.

The Customs authorities do attempt to classify imported apparatus and supplies, but their present classifications are useless, as pointed out in the classifications and figures we previously have quoted.

What the Dominion Statistician wants is support and the Customs authorities' advice, and by united effort on the part of electrical manufacturers and jobbers, we can render both departments a service which will help all in the industry to a better understanding of what business is obtainable in the Dominion for the electrical concerns operating in this country.

The letter of the Canadian Johns-Manville Company, Limited, also put forward the idea that the Customs authorities in Ottawa are alone able to deal in a comprehensive manner with these matters, stating that we can do little individually. This is our argument and we are asking for co-operation from other manufacturers and jobbers in Canada, so that some representation can be made to the proper authorities, if not through an association, through the Electrical News. If you, Mr. Editor, will call for suggested classifications and requirements of all manufacturers and jobbers in Canada, we feel that you could well represent the industry as a whole at the proposed conference in Ottawa at an early date. We have already stated that the Dominion Statistician stands ready to receive such representation, so that it is en-rely on the hands of those interested in the industry to put forward our requirements in a comprehensive manner and we have assurance that we will obtain a sympathetic hearing.

Mr. Duncan of the Duncan Electric Company, Limited, in his letter, points out that publication of statistical figures might be to the disadvantage of Canadian exporters, a point which we have not touched upon, and it would appear that if such statistics as we are asking for were obtainable, manufacturers in Canada would benefit rather than lose anything by ascertaining a true conception of the value of imports into Canada.

Mr. J. L. Frink of the Square D Company is frank in his statement concerning the opportunity afforded now to "get together and furnish the authorities in Ottawa with an outline of the information that we believe to be essential to the welfare of the electrical industry as a whole. Mr. Frink's point, that we require more statistical information on the size and character of our potential markets, is well taken; and we believe that if sufficient interest can be aroused within our own industry the authorities in Ottawa will give us all the information we require, but we must bear in mind that all things have to have a beginning, and if we can obtain a comprehensive survey of Canadian manufacture and imports, we will quickly see what other statistics can be obtained which will show us where the material thus accounted for goes to and where more material is required.

It is our opinion that with the enormous investment in the electrical industry taken into consideration, and a desire made known to assist the authorities to obtain statistical data for the industry as a whole, that such surveys will be made by the Dominion statistician from time to time, which will give us potentialities without any extra draw upon the finances of the country, and suggestions to this end can be decided upon and placed before the authorities when our representations are made for the statistics for which we are at present asking.

Yours truly,
F. W. Johnson,
Statistical Department,
Northern Electric Co.

[The classification which Mr. Johnson suggests as a basis for discussion is given herewith. Those of our readers who are interested in this matter are asked to be good enough to give a little thought to this list, and more particularly to the part that affects their special line of trade, and offer suggestions looking to the improvement and clarifying of the classification.—Editor.]

Suggested Classification

Annunciators.
Arresters, Lightning.
Batteries: (a) Automobile storage; (b) dry cell; (c) primary; (d) storage.
Bells, door.
Boxes: (a) Floor and covers; (b) outlet; (c) switch.
Buttons, push.
Buzzers, signal.
Cable, lead covered.
Circuit breakers.
Clamps for electric railways.
Coils, choke, etc.
Conduit: (a) Flexible; (b) flexible steel; (c) rigid.
Conduit Fittings: (a) Armoured conductors; (b) bushings; (c) ground clamps; (d) locknuts.
Converters, rotary.
Dishwashers.
Drills, industrial.
Drink mixers.
Dynamos and Generators. (a) Alternating current; (b) direct current.
Egg boilers.
Fans.
Farm Lighting Plants.
Fire alarm apparatus.
Fibre, insulating.
Fixtures, lighting.
Frogs for electric railways.
Fuses and Cutouts: (a) Enclosed and renewable fuses; (b) porcelain cutouts; (c) blocks and clips, (1) porcelain, (2) slate.
Glassware, other than lamps and complete fixtures, i.e., bowls, globes, reflectors, etc.
Gongs, signal.
Grinders, industrial.
Hair driers.
Heaters: (a) Air; (b) water.
Heating Pads.
Hangers for electric railways.
Hammers.
Irons: (a) Curling; (b) domestic; (c) tailors.
Ironing machines.
Lamps. (a) Incandescent; (b) tungsten; (c) carbon; (d) nitrogen; (e) miniature and candelabra.
Lights, flood.
Magnets: (a) Lifting magnets; (b) magnetic clutches; (c) magnetic separators, etc.
Marine material.
Medical apparatus, ray machines, violet ray machines, etc.
Milk warmers.
Meters and measuring instruments: (a) Indicating instruments; (b) graphic or recording instruments; (c) integrating instruments (watt hour); (c) miscellaneous meters, pyrometers, luminometers, etc.
Motors, Polyphase: (a) Direct current; (b) alternating current. Single phase: Alternating current. Small type: Such as household, buffing, grinding and jewellers'.
Motor generator sets.
Panel boards.
Plugs, atachment.
Poles: (a) Trolley; (b) wooden, telephone or electric light; (c) iron, telephone or electric light.
Porcelain for electrical work.
Pumps.
Ranges: (a) Hotel; (m) domestic.
Rectifiers.
Receptacles.
Rheostats and Controllers.
Rosettes.
Sewing machines.
Soldering salts and pastes.
Sockets: (a) Brass; (b) composition; (c) porcelain.
Switches: (a) Flush; (b) snap; (c) knife; (d) oil.
Switch plates.
Switchboards: (a) Fire alarm; (b) power; (c) telephone; (d) telegraph.
Tape.
Telephones: (a) Manual; (b) intercommunicating; (c) automatic.
Telephone sets.
Telegraph instruments.
Toasters.
Transformers.
Vacuum cleaners.
Vibrators.
Washing machines.
Wheels, trolley for electric railways.
Wire: (a) Iron galvanized; (b) bare; (c) weatherproof; (d) rubber covered; (e) magnet.

Electric Drive in the Steel Industry

Of Forty-three Blooming Mills Installed in Recent Years All But One Are Motor Operated—Low Cost of Power, Repairs and Maintenance and Fewer Delays

The regular meeting of the Toronto section of the American Institute of Electrical Engineers was held in the Chemistry and Mining Building of the University of Toronto on November 26th. The speaker of the evening was Mr. E. S. Jeffries, chief electrical engineer of the Steel Company of Canada, who enlightened his audience on the subject of "Steam vs. Electric Drive as Applied to the Steel Industry."

Mr. Jeffries briefly outlined the many advantages of the electrical method of drive in the steel mill, among which the following may be named: Greater over-all efficiency obtainable with variable speed reversing motors than with the steam engines; added efficiency due to regenerative braking; ease, simplicity and speed of electrical control; simplicity of maintenance of electrical equipment as compared with steam; ease of determining load conditions and of obtaining test data at any time; quietness, smoothness and safety of operation.

A matter of particular interest to all is the method whereby the exceedingly fluctuating load curve of the steel mill is smoothed out, so as to ease the demand upon the central station. The direct current for the motors is derived from a motor-generator set which obtains its power from the a.c. mains of the transmission company. This set is equipped with a heavy fly-wheel. In the main feeder to the motor is inserted a set of current transformers feeding current to a "torque motor" connected in turn to liquid rheostat in the rotor of the main motor. Upon a heavy rush of current, the torque motor operates to increase the rotor resistance, thus increasing the slip of the main motor, and allowing the set to draw upon the fly-wheel for its extra power. With this apparatus properly adjusted, the fluctuating demand of the steel mill is converted into a very smooth load curve of a good load factor.

The speaker pointed out that the present tendency is towards the elimination of the steam engine for main drives in the iron and steel industry. Of 43 blooming mills installed during the last seven years only one steam engine was found, and in that case local conditions were very favorable to the generation of low priced steam. In bringing about this condition labor had been an important factor. The average operator looks on electric drive favorably on account of the better conditions surrounding the operation of the steel plant when driven by electric motors. Whereas under steam engine conditions the mill was noisy and dirty and the work very laborious, present conditions are very much improved and it is the rule that the crew from the steam engine will look upon a transfer to the electric mill as a promotion.

Executives of steel plants were chiefly interested in the three main factors of electric drive, namely, low cost of power, low cost of repairs and maintenance, and greater reduction in delays. Other favorable factors, which are worth considering, however, are that standby losses are eliminated, that little time is required to get under way after a shut down, the rotative energy of the mills is not totally wasted, motor drive provides ideal speed control with great simplicity, there is a constant turning movement, mill breakages are small, the layout of the mill is simplified, real estate charges are low, and finally the motor drive lends itself to centralization of power and is an ideal load to add to any generating station.

A discussion of the general overall efficiency of the mill with electric drive as compared with steam drive was elaborated by Mr Jeffries, who defined efficiency not as the ratio of input to output electrically, but of input to the output of the mill, taking into consideration the fact that due to fewer delays the mill actually operates longer and due to lower repairs and maintenance the production costs are somewhat lower. In addition to this he emphasized the fact that a motor rolls with about one-half the consumption of power throughout a day's operation of that required by a steam engine. Another fundamental advantage possessed by the electrically driven mill over the steam engine is that the electric motor will accept the propelling force just as fast as the load on the motor demands it.

The final advantage which is not often appreciated by the average executive or operator is that due to its inherent qualities the motor drive is maintained at a higher state of efficiency than the steam drive. As Mr. Jeffries pointed out, long steam lines can be kept tight and thoroughly insulated, and valves of the driving engine can be kept perfectly adjusted, and the vacuum can be maintained at the maximum, but such cases are rarely found in actual practise. The simplicity of maintaining efficiency with electric drive, however, guarantees that the equipment is constantly kept in a high state of efficiency.

In summing up, the speaker quoted the opinion of his company's own rolling superintendent and of their master mechanic on the question of steam versus electric drive. The superintendent had stated that he

Mr. Ernest S. Jeffries is chief electrical engineer for the Steel Co. of Canada, Hamilton, Ont., and is prominent in the steel industry.

He was born in Ohio in 1877 but has spent much of his life in Canada. He is a graduate in mechanical engineering of the Worcester Polytechnic Institute, and was at one time in the employ of the Marconi Wireless Telegraph Co. He has held his present position since 1912, during which period the Steel Co. of Canada has come to be recognized as one of the most modern electrically-driven steel plants in the Dominion.

Mr. Jeffries has served as a member of the Iron and Steel Industry Committee of the A.I.E.E. and has been a member of the board of directors of the Association of Iron and Steel Electrical Engineers, and at their last annual meeting was honored by election to the presidency of that association for the present year.

would recommend and insist upon any reversing equipment which was to come under his jurisdiction being electrified along the lines of their present equipment."

The master mechanic had said "the electric drive is superior from every point of view."

Both the vice-president and the general manager of the company, Mr. Robt. Hobson, were also stated to have expressed themselves to the effect that their motor equipment had given them so little trouble that they would not know of is existence did they not visit the plant occasionally and see it in operation. This surely is a splendid evidence that the motor equipment of the Steel Company of Canada is not causing delays or shut-downs.

The talk was illustrated by several reels of pictures showing the practices of some of the earlier mills compared with the modern electrically driven mills, and also demonstrating many of the safety features in use. A number of slides were also shown illustrating the economic features involved in the electric drive, and portraying the details of construction of the power motors used in this plant.

The paper was discussed by Messrs. Hart, Cooper, Volkmann, Anderson and Borden. A vote of thanks was moved by Mr. Wright and carried unanimously.

One-Passenger Electric

The SB-Automobil-Gesellschaft m.b.h., Berlin, Germany, is manufacturing a small electric runabout believed to be a novelty in the automobile field. The car is manufactured in only one model, a one-passenger runabout, with a wheel base of 57.12 inches and a tread of 33.45 inches, and weighs 440 pounds. To this can be attached a two-wheeled trailer for an additional passenger or for light delivery purposes. Electric current is furnished by two 24-volt lead-plate batteries of 6 cells each. These require 2½ kilowatt hours for a full charge, which will drive the car about 35 miles. The electric motor develops about 1½ horsepower and permits of a maximum speed of approximately 13 miles per hour.

Activity in Telephone Construction

The Superintendent of Rural Telephones of the Province of Saskatchewan states that in spite of construction difficulties, aproximately 4,800 pole-miles will be added to the rural telephone system of the province during the present year. This is approximately the same amount as was added during 1919.

The Trend of Wholesale Prices

A most interesting table of wholesale prices covering representative commodities is published in the December issue of Commerce Monthly. The figures quoted are those ruling in January, April, July and October of each of the years 1914-15-16-17-18-19 and 1920, and it is plain from the general trend of these quotations that the peak has been passed in nearly every case. In certain instances, indeed, today's price is less than it was in 1914, rubber being a conspicuous example.

In the table below we quote the various items given in the original article, omitting certain of the intermediate prices. The figures quoted are , (1) the prices in Jan. 1914, (2) the highest price reached by each commodity, and the date at which this highest price was reached, and, (3) the prices as at Nov., 1920. Where no quotation is given under heading (2) it indicates that there has been a gradual increase in price up to the present time and no recession is yet in evidence. This applies to anthracite coal and to petroleum.

Commodity	Unit	1914 Jan.	Highest price reached	Date of highest price	1920 Nov.
Cattle—Fair to choice native steers, Chicago	Dols. per 100 lbs.	8.60	$ 16.80	Oct., 1919	11.25
Coal—Anthracite, No. 1 buckwheat, f.o.b. lower ports N. Y.	Dols. per gross ton	2.25			8.00
Anthracite, stove, f.o.b. mine	Dols. per gross ton	4.00			8.00
Bituminous, run of mine, f.o.b. mine Fairmont, W. Va.	Dols. per gross ton	.85	12.00	July, 1920	a5.50
Pittsburgh District	Dols. per net ton	1.30	11.00	August., 1920	a5.00
Copper—Electrolytic, early delivery, New York.	Cents per lb.	14.12½	2.00	April, 1917	14.50
Corn—No. 2 mixed, Chicago	Dols. per bu.	.62½	2.15	May, 1920	.83½
Cotton—Middling, spot, New Orleans	Cents per lb.	12.88	41.50	April, 1920	18.25
Hides—Green salted packers, No. 1 heavy native steers, Chicago	Cents per lb.	17¾	52	July, 1919	23
Calfskins, No. 1, Chicago city	Cents per lb.	21	90	Oct., 1919	18
Hogs—Good merchantable—pigs and rough stock excluded, Chicago	Dols. per 100 lbs.	8.25	22.10	July, 1919	12.60
Iron and Steel—Pig iron, basic, Valley furnace	Dols. per gross ton	12.50	53.00	July, 1917	38.50
Steel billets, open hearth, Pittsburgh	Dols. per gross ton	20.00	100.00	July, 1917	b50.00
Lead—Pig, early delivery, New York	Cents per lb.	4.10	10.75	July, 1917	6.60
Petroleum—Crude, at well Pennsylvania	Dols. per bbl.	2.50			6.10
Kansas-Oklahoma	Dols. per bbl.	1.03			3.50
Rubber—Plantation, first latex crepe, N. Y.	Dols. per lb.	.56	.92	Jan., 1916	.20
Para, upriver fine, New York	Dols. per lb.	.73	.86	Jan., 1916	.22
Silk—Shinshiu No. 1, New York	Dols. per lb.	3.80	16.25	Jan., 1920	6.30
Spelter—Prime western, early delivery, St. Louis	Cents per lb.	5.10	21.00	July, 1915	6.37½
Sugar—96° centrifugal, New York	Cents per lb.	3.29	21.57	May, 1920	6.51
Wheat—No. 1 northern spring, Chicago	Dols. per bu.	.91½	3.30	May, 1920	1.88¾
No. 2 red winter, Chicago	Dols. per bu.	.96½	3.06	May, 1920	2.11¾
Wool—Clean basis, Boston					
Ohio fine delaine	Dols. per lb.	.58	2.35	Mar., 1920	1.25
Ohio ¼ blood	Dols. per lb.	.39	1.35	Apr., 1918	.57

(a) Range $4.75 to $6.00. (b) Range $50.00 to $55.00.

"Service at Cost and Efficient Management" by Hon. Fielder Saunders, Street Railroad Commissioner, Cleveland*

Mr. Saunders sketched the history of the adoption of the Cleveland franchise and quoted its preamble, which included among its objects "that the rate of fare may be reduced" and that "the best street railway transportation might be secured at cost, consistent with the security of the property and the certainty of a fixed return thereon, and no more." In the speaker's opinion the franchise has resulted in a great civic benefit and this is also the conclusion reached after long study conducted during the first half of this year by a board of arbitrators appointed to consider the question of return to the company. This board was made up of the city commissioner of light and heat, the president of one of the largest banks in Cleveland and the federal judge of the district. This board said in part: "The franchise and the amendments thereto have been shown by ten years of trial to be sound in principle, practical in operation, and of great benefit to the Cleveland Railway Company and its stockholders and to the public" and "have resulted in giving to Cleveland the best street railway service at the lowest cost of any city in the United States."

Mr. Saunders said that while it is true that the fare has almost doubled, every other commodity has practically doubled its price in the last ten years, and he pointed out that the wages of the trainmen had increased from 26 cents to 75 cents per hour or in even greater ratio. In the meantime the rolling stock has been increased from a seating capacity of 36,100 in 1910 to one of 74,800 in 1920. The total standing capacity has been increased from 44,000 in 1910 to 80,460 in 1920. The miles of track have increased from 246 to 303, many modern carhouses and substations have been built, and shops have been erected at the cost of $1,300,000.

Another way, Mr. Saunders said, of determining whether a contract has carried out its purpose is to consider the attitude to it of the contracting parties. The Cleveland franchise has been criticized at various times because of the so-called lack of incentive in it. Nevertheless, the people of Cleveland are satisfied. Thus, when the first period of the grant expired on May 1, 1909, it was necessary before that time for the city government to renew the franchise for a period of twenty-five years or permit the property to continue in the hands of the company without city control of the service, or to exercise its option to buy it and put in force municipal ownership. A series of meetings was held by a committee of the council having the decision to make and the matter was widely advertised in the newspapers. Nevertheless, all the amendments suggested as being desirable came from the street railway commissioner. No public sentiment was manifested for municipal ownership nor for any particular change in the grant, except on the part of a few councilmen and a few public officials who had been in very close relationship with the railway company and its day-to-day operation. No amendment was offered by any civic society of Cleveland, nor by any newspaper nor by the Chamber of Commerce nor by any of the various clubs interested in public matters. The railway company refused to accept the amendments suggested and said that it was satisfied with the franchise as it stood. It immediately became evident that the public also was satified with the franchise, and the city council renewed the agreement in identical terms for a further period.

The one serious problem pending at present relates to the return to the stockholders, which is limited in the franchise to 6 per cent. Extensions to the property have always been financed by the sale of new stock, but for more than a year it has been impossible to sell Cleveland Railway 6 per cent. stock at par in Cleveland, and the franchise forbids the stock being sold for less than par. Although extensions are needed, the people evidently thought the proposed change to 7 per cent. too far-reaching and failed to approve it at a popular vote, so that at present, so far as this is concerned, matters are standing still, but the speaker said he had no doubt the problem would be worked out satisfactorily in a mutual spirit of co-operation, as have so many of the previous difficulties.

The speaker said that most of the criticism of the service-at-cost plan as developed in Cleveland in the last ten years was as to the lack of incentive, but he pointed out that this is really directed at some of the conditions in the franchise and not at the working out of the franchise as shown in operation. The speaker then explained at length why these conditions had not proved objectionable in Cleveland.

The Incentives in the Cleveland Franchise

In the first place he pointed out that the Cleveland Railway is not under absentee ownership. The management is largely represented among the stockholders, and some of the present success is undoubtedly due to that fact. The management also has the benefit of daily counsel and criticism of the city commissioner; not monthly or annually as is granted by public service commissions; nor has the criticism been selfish, partisan, or political. It is true that during the past two years it has become the practice to write into service-at-cost franchises a so-called incentive by which the stockholders of the company may get additional and varying returns under certain circumstances, as in the Cincinnati sliding scale, the Montreal budget system, and the new Rochester franchise. The speaker said he had no particular quarrel with such provisions at this time, but personally he had serious doubt whether in practical operation any of these ideas will produce any tangible lasting good, and he wanted to wait the test of experience.

When the present franchise was being considered in March, 1909, by Mayor T. L. Johnson and President Horace E. Andrews with various councilmen, one suggested a sliding scale of interest, so that the return to the company would increase with decreases in the fare, on the ground that it would be an incentive to the stockholders to make the fare as low as possible. Mayor Johnson replied that it would also be quite as much an incentive to skimp the service, and Judge Tayler ruled that a fixed return would be better. On this point Judge Tayler expressed his belief that it was fundamentally wrong to pay a man a bonus for doing that for which his salary is supposed to compensate him, that a bonus could not be a legitimate part of the cost and that therefore such an arrangement would mean service at more than cost, and that the people were entitled for the salary they paid to the officers of the railway to intelligent and efficient management and that they ought not to be taxed any more.

Mr. Saunders said that he agreed with this statement of Judge Tayler and added that the bonus idea is not only fundamentally wrong but that practically it would not work because it would create an incentive on the part of the railway company to keep down its expenses by skimping the service. Under the present service-at-cost plan, the company has no desire to do this. Within the limits of its power to earn 6 per cent., it makes no difference to the company how much or how little service is run. But any temptation of an added dividend would create a tendency on the part of a company operating under such a franchise to encroach on the city's perrogative as to service and to render a cheaper

---

[illegible]

and more unsatisfactory service even though ostensibly complying with the city's order.

There would also be an incentive for the management not to keep the property up, because the lower the maintenance charges the lower the rate of fare and the higher the returns of the stockholders. There would also be an incentive to keep down the maintenance by increasing the capitalization by charging repairs and replacements to capital.

Again, some financial experts maintain that there is a connection between current interest rate and the price of commodities, that they rise and fall together. If this is the case, Mr. Saunders said, as the cost of labor and materials used in railways go down, the return on the money invested should not go up, but under the present "incentive" service-at-cost franchises the return to the stockholder will go up as the fare goes down, instead of going down as it should if the rule just mentioned is correct. Moreover, such an arrangement is likely to be a bad one from the public standpoint, if we have reached the peak of high prices, because under the sliding scale, as prices go down the returns would go up. But even if all of these conclusions are wrong, any scheme of incentive so far suggested is open to the criticism of lack of effectiveness because of the remoteness from and lack of direct application to the actual executives. From the speaker's knowledge of what had happened in the last five years he believes that, after all, the real incentive to efficient management is to give the man at the wheel, the man who actually operates, sufficient compensation to keep his best interest in his work and then to have an efficient city administration to act as the watchdog, to criticize, advise and sit on his neck day by day as is done in Cleveland to see that he earns his salary.

Gain in Winnipeg Earnings

Gross earnings of the Winnipeg Railway for the nine months ending September 30th, aggregated $3,796,337, against $2,912,851 for the corresponding period of a year ago. This represents an increase of $883,486, or 30.33 per cent. Operation expenses at $2,852,966, although an increase of $466,432, or 19.5 per cent., represents an improvement in the efforts of the enterprise, and net earnings for the period at $943,371 show a gratifying increase of 79.2 per cent., or $417,953. The earnings do not take into consideration the rate increase lately granted the street car service, that is, 7 cents straight, or four tickets for 25 cents. In this connection it is interesting to note that in the United Sates eighty-one cities have 10-cent fares, and fifty-five have eight-cent fares. Chicago is getting ten cents on its elevated lines, and eight cents on its surface lines. The only companies in Canada receiving a ten-cent fare, so far as we can learn, are one or two municipally-owned lines in Western Canada.

C.E.R.A. Annual Meeting

The annual meeting of the Canadian Electric Railway Association will be held in Ottawa, January 17-18, when representatives of all the electric roads, both private and municipally-owned, will be in attendance.

L. E. & N. Had Bad Fire

The Lake Erie & Northern power house and car barns, at Brantford, Ont., were destroyed by fire on Monday, November [illegible]

The ratepayers of London (Ontario) will shortly be asked to vote on a plan to build a dam across the Thames River to supplement the Hydro supply, at a cost of $200,000. The dam would be built near the site of the one that collapsed three years ago, and later another would be erected at Komoka, five miles away.

All Toronto Railway Co.'s Subsidiaries Purchased by Province and City

After many months of negotiation an agreement has been reached between the Hydro-electric Power Commission of Ontario and the city of Toronto on the one hand, and the Toronto Railway Company on the other, or, as it is generally called, the Mackenzie interests, for the transfer of all the subsidiary companies and properties of the Toronto Railway Company to the province and the city.

The total sum of money involved in the transfer is $32,734,000, of which the city of Toronto pays $10,186,295 and the province $22,547,705.

The province of Ontario on its part obtains possession of the following:—

(1) The hydro-electric generating plant of the Electrical Development Company at Niagara Falls.

(2) The transmission lines and transformer stations and equipment which supply Toronto and other points in the province.

(3 A steam reserve situated at the foot of Scott Street in the city of Toronto.

The hydro generating plant has a normal capacity of 125,000 horse-power, but, under pressure, has generated well up to 150,000 horse-power, and at the present time is carrying a steady load of approximately 140,000 horse-power.

The transmission system consists chiefly of two double circuit steel tower lines connecting Niagara Falls with Toronto. One of these is equipped for transmission at 60,000 volts and one at 80,000 volts. Numerous branch lines also feed a number of large customers in the Niagara district. The terminal station in Toronto is also included.

The steam reserve consists of two fairly modern steam turbo-generators of normal capacity approximating 10,000 horse-power each, and capable of carrying 25,000 temporarily.

The city of Toronto comes into possession of

(1) The entire distribution system of the Toronto Electric Light Company in and around Toronto, and

(2) The lines and equipment of the Toronto and York Radial Railway Company.

The Toronto and York Radial Railway Company includes three sections, namely, the Metropolitan division, running north up Yonge Street, branching off at Newmarket and travelling in a north-easterly direction to Sutton on Lake Simcoe; the Scarborough division, starting at the Woodbine and travelling in a north-easterly direction, and the Mimico division, starting from Sunnyside in the western portion of the city and passing through the towns and villages along the lake shore road as far as Port Credit.

A small part of each of these three sections lies within the city limits, but it will be remembered that a few years ago the city of Toronto purchased the trackage of the Scarborough and Mimico divisions lying within the city limits.

The purchase of the outlying sections of the Toronto and York Radial System by the city of Toronto is made with the understanding that the municipalities through which these roads travel shall have the option at an early date of purchasing them from the city and handing them over to the Ontario Hydro as part of a general radial scheme. The city of Toronto proposes to retain in its possession, however, such parts of the three sections as lie within the city limits. For purposes of adjustment the value of the part of the Metropolitan division within the city has been placed at $585,000 and the value of the three sections of the radial lines lying outside the city limits has been placed at $2,375,000.

Canada's Pacific Province is rapidly Forging Ahead Electrically

Vancouver's Electrical Show

Was the First of Its Kind in That City and a Splendid Success—The Newly Formed Co-operative Association Very Active and Enthusiastic

Vancouver's first electrical show was declared open Monday, November 22nd, 1920, by Mayor Gale, and entered on a week of whole-hearted co-operative effort and accomplshment. It was held in the Drill Hall, Beatty Street, under the auspices of the British Columbia Electrical Co-operative Association of which the president is Mr. George Kidd, general manager of the B. C. Electric Railway Company.

The show is the first public work of the Co-operative Association which was formed in the autumn. The manager of the show was E. E. Walker and the assistant manager J. F. Little, and they have been assisted by a committee composed of Messrs. E. Brettell, H. Pim, W. C. Mainwaring, J. Lightbody, E. H. Hughes, S. E. Jarvis, W. W. Fraser, J. R. Read, J. Muirhead and George Horsman. The elaborate wiring and illumination has been in the hands of W. W. Fraser; the design and decoration in charge of E. Brettell; the light and power supply under the direction of J. Muirhead. All branches of the industry co-operated to make the show a success from the electrical dealers and manufacturers to the central stations. Light and power was supplied free by the B. C. Electric Railway Company and every booth was supplied with an instrument by the B. C. Telephone Co., so that nothing should be lacking in making a brilliant showing.

The booths were laid out in old mission style, the architecture being the work of J. A. Benzie. Immediately on entering, the visitor was confronted by a large pergola, topped by trellis work and floral decorations. The color scheme was yellow, orange and purple, and this was carried out down the aisles. Colored lights strung through the flowers and leaves made the building especially distinctive. The low ceilings and substantial pillars and supports of the mission type of architecture gave the booths a very cosy and inviting effect and won expressions of approval from all.

The illuminations were exceptional both outside and inside. There were twelve large lights suspended from the roof, each of a thousand candle-power, which provided ample general lighting for the building. Each booth had its individual lighting as well as ample outlets for appliances and electrical devices.

Some of the exhibits were featuring electrical household work, such as electric cooking, washing, ironing, etc. There was a refreshment booth in the show which used electrical cooking apparatus throughout. These features made the exhibits as near actual conditions as it was possible to make them. A private exchange installed by the B. C. Telephone Company was located in the telephone company's exhibit. A rest room, furnished in cretonne and wicker furniture, was provided for the ladies, but was seldom occupied as the ladies were too busy deciding on the relative merits of the different washing machines and vaccum cleaners.

The Rotarians attended in force on Tuesday and took possession of the show and the Kiwanians did likewise after their Thursday luncheon. The Electrical Association held their weekly luncheon in the building on Friday, Mr. Little presiding, and all the exhibitors in brief addresses gave their impressions of the show. The general concensus of opinion was that from an educational standpoint the show was a decided success and while the object of the show was not to make sales, many reported that they had sold

MEMBERS OF THE VANCOUVER ELECTRICAL SHOW COMMITTEE
Back row, left to right: Messrs. W. C. Mainwaring, W. W. Fraser, S. E. Jarvis, E. H. Hughes, J. Muirhead, E. Brettell.
Front row: Messrs. H. Pim, E. E. Walker, J. F. Little, J. Lightbody.

B. C. Electric Co. attracted the crowds with Electric Cooking Booth handsomely decorated

[illegible] electrical appliances to visitors. It was announced that another and bigger show would be held next year and larger premises secured in order to accommodate all who would wish to exhibit. Credit was given to Mr. E. E. Walker, manager of the show, and to Mr. W. G. Murrin to whose perserverance the show was mainly attributable. Great credit is also due to Mr. W. C. Mainwaring, the secretary of the association, whose geniality and helping hand smoothed over many of the rough spots. The spirit of co-operation which existed throughout the show was gratifying to behold and that it was practical as well as theoretical was shown many times over when exhibitors, in many instances, went into a rival dealer's booth during his temporary absence and demonstrated his appliances with strict impartiality.

The social end of the exhibition was not neglected by any means, as the band of the 74th Battalion furnished music during the day while a full orchestra provided excellent music for the dancing couples who were whirling around on the specially laid dancing floor in the center of the building, from 8:30 till 11:30 p.m.

It is estimated that 13,000 paid admissions passed the turnstiles. The general opinion was that the electrical industry in Vancouver has been put "on the map" by the show and that the electrical dealers have both shown the public and convinced themselves of the opportunities before them.

A brief description of the various booths is given herewith.

Northern Electric Company's Fine Display.

Bright lights and a shocking time were the paramount features of the Northern Electric Company's exhibit, the latter being given by an electrically charged hand rail which provided a warm reception for the unwary and much amusement to the initiated. A row of Edison White Mazda lamps outlined the booth, while the inside was fitted with numerous Brascolite fixtures. The greatest interest was divided between the Western Electric Dishwasher and a complete Wotton battery charging motor generating set, both being shown for the first time in Vancouver. Feminine interest was of course attracted to the dishwasher and it aroused much favorable comment. In the centre of the booth was a revolving pyramid stand on which a complete line of electrical household appliances was prominently displayed. The "Square D" safety house switch, externally operated, also made its debut to the Vancouver electrical world in this booth. A line of Columbia batteries and Eveready flashlights and batteries completed this attractive exhibit. Mr. W. Mainwaring, the genial sales manager of the company, was in charge of the booth and not only made a decided success of his own exhibit but by his untiring efforts contributed greatly to the success of the whole show.

Interesting Electrical Industrial Equipment Display

The Canadian General Electric Company had a somewhat technical display, especially interesting to the users of electrical motors and equipment for industrial uses. Occupying the centre of the booth was a Wallace bench planer

[illegible] General Electric [illegible] ing industrial equipment as [illegible]

The booth of The Electric Supply & Contracting Co. was most attractively decorated — A guessing contest was one of the features

and a bench circular saw of the same make. Motors, transformers and controllers occupied the left of the booth, while household appliances and washing machines were prominently displayed on the right. Violet Ray generators were shown and attracted much attention. In the centre of the back wall was a case of electric lamp bulbs showing every size and variety of lamp used and sold, while below was a National Mazda demonstration case showing every stage of the manufacture of this lamp from the fresh blown glass to the finished product. A huge circular sign outlined in the new Edison Mazda tipless lamps and carrying out the monogram of the company in red bulbs completed the decorative scheme of this exhibit and lent a colorful touch to the booth. The Economy renewable link fuses were another feature of this exhibit and the representative of the Economy Co., gave daily demonstrations which were of great interest to both the householder and users of industrial equipment.

E. B. Horsman & Son.

E. B. Horsman & Son occupied a very attractive booth opposite the entrance to the show which immediately engaged one's attention by the clever arrangement and color scheme. In the centre of the booth a pyramid shaped display stand draped in purple velvet and lighted with frosted bulbs, set off to great advantage the various appliances. The Hughes electric range and Apex Vacuum Cleaner, for which this firm are B. C. distributors, were prominently displayed.

Interesting Christmas Display.

One of the most beautiful and interesting booths in the show was that of the Electrical Supply and Contracting Co. A seasonable Yuletide spirit pervaded the exhibit and the various appliances shown were chosen for their appropriateness as Christmas gifts. In the background was a mountainside in miniature with an electric train running around its sides, over trestles and through tunnels. A guessing competition was held as to the number of miles travelled by the train during "Show Week" with the train complete as first prize and an electric toaster as second choice. The right of the booth was fitted up as a bedroom, featuring electric toilet table appliances and reading lamps for those who read in bed. A huge Christmas tree occupied a corner, decorated with miniature decorations and lights and was a source of great interest to the younger visitors to the show.

The new Free Westinghouse electric sewing machine and the Eden electric washer were prominently displayed and the interest shown in both these articles by the lady visitors presaged an excellent Christmas season business for this firm. The careful and well-thought out placing of table and floor lamps contributed greatly to the attractive and homey aspect of this booth. Mr. E. Brettell, senior partner of the firm, was in charge of the booth and Mr. J. Churchland was responsible for the beautiful effects and ensemble.

Household Laundry Equipment Shown.

Kanaly's Ltd., B. C. distributors of the Eden electric washer and Simplex ironer, had an exclusively domestic display. The booth was fitted as a modern laundry with stationary tubs, electric washers foaming with hot suds and electrically operated and heated ironers. Demonstrations of both washing and ironing were carried on daily and a very successful week was reported by this company.

Hoover Suction Sweeper Co. of Canada, Ltd.

This company had a very attractive exhibit which, with the demonstration provided by Mr. Gleeson, the local repre-

[illegible] [illegible] & [illegible] made a special feature of their "Radiant Fires" in various types sentative, was favorably commented upon and attracted many enthusiastic prospects. In front of the booth was a rug which had been stamped, scraped and walked upon for the entire week by every visitor to the show and which was taken up and cleaned on the final night of the show. A free guessing competition was held throughout the week and the closest guess to the number of pounds and ounces of dirt taken from the rug won a Hoover Special Suction Sweeper.

The A. B. C. Super-Electric Washing Machine.

This machine occupied much of the space in the booth of Rankin & Cherrill, B. C. distributors. As electric washing machines seemed to hold the centre of the stage throughout the entire show, the A. B. C. was continually in the limelight and Mr. Slater, who was in charge of the booth, lost no opportunities to convince the prospective purchaser of the superiorities of the A. B. C. over other types of washers. A display of table lamps and household appliances completed the exhibit.

The Muir Electric Company's Splendid Display.

A varied line of merchandise marked this firm's exhibit and was the means of attracting much attention to the booth. The "Miss Simplicity" electric washer and the "Tuec" vacuum cleaner occupied the centre stage, while heaters and Branston Violet Ray generators shared secondary honors as interest holders. Lionel electric trains travelled busily around the exhibit and needless to say were a source of great interest and enjoyment to the younger visitors.

An Instructive Exhibit by the B. C. Electric.

The appetizing odor of fresh baked bread and biscuits drew one irresistibly to the B. C. Electric's booth, where cooking demonstrations were held daily on the Moffat electric ranges. A lavish use of cotton-wool and imitation snow and a life-size figure of Santa Claus on a revolving stand lent a real Christmas atmosphere to this exhibit and suggested to the visitor the suitability of electrical gifts for the coming holiday season. The snow-tipped mountains and miniature fir trees seen in the background lent a great sense of depth and distance to the booth. Household appliances and domestic laundry equipment were shown and fine fixtures gave a bright appearance to the exhibit.

The Booth Beautiful.

Farr, Robinson & Bird, manufacturers and distributors of the "Radiant Light," were conceded to have the prettiest and most effective booth in the show and the concession was well deserved. The walls were attractively finished in royal purple with gold panelling and showed much thought and care in the color scheme. A sense of luxury and well-being was imparted by the heavily upholstered chairs and day bed. The various types of "Radiant Light" fixtures were tastefully arranged around the walls and from the ceiling and the parchment shades which were a feature of this exhibit elicited much favorable comment.

Distinctive and unusual multiple light fixtures in the polychrome finish which is an original feature of this firm's products, were a source of interest and admiration to all. The booth was the more effective for the numerous household appliance displays surrounding it which, though interesting and instructive, did not lend themselves to a really beautiful color scheme.

Jarvis Electric Co., Ltd.

An exhibit of interest more to the technically-minded than to the casual visitor was that of Jarvis Electric Company, Ltd. The Philadelphia Diamond Grid Battery was much in evidence and a guessing competition on the number of slots in a retainer which was in a water-filled jar ensured attention being drawn to the various exhibits.

The rear wall was covered by a four panel 8 ft. x 6 ft. switchboard manufactured by this company for a local concern, with a capacity of 500 h.p. for motors and 200 h.p. for lighting. A complete installation of the Swanlite farm lighting system and of the Paul electrically-operated water system completed the exhibit. This company are specializing on industrial power application and are rendering an engineering service that is fast becoming of great importance in the province.

Vancouver Technical School Educational Exhibit.

This exhibit was of common interest to both the public and other exhibitors showing the excellent work being done in this school in giving the younger generation of Vancouver a sound technical training, enabling them to go out into the industrial and business world with something of value to sell. Examples of woodworking, sheet-metal working, tool making, metal lathe work, and mechanical drawing, were shown, all done by students in the various years. The mechanical drawings are worthy of special mention, as they showed a thoroughness and finish hardly believable in a second or third year student's work. Altogether, this exhibit was one of the most interesting in the entire show and much credit is due the principal of the institution, Mr. J. G. Lister.

A Section of Percy F. Lett's Display

Fire Protection Apparatus Makes Interesting Feature.

The booth of Percy F. Letts adjoined the ladies' rest room and contained an attractive display of boudoir, table and reading lamps. In the front of the booth was a complete fire detection and alarm system and an International Automatic Sprinkler Equipment supplied by Messrs. Barr & Anderson, Ltd., and electrically supervised by the B. C. District Telegraph Co. Much attention was given to this exhibit and a trial run given by the Vancouver Fire Department in connection with the operation of this equipment did much to stimulate interest in this booth.

Modern Utilities, Ltd.

"Delco Light" was the feature of this booth and was especially attractive to the farmer visitor and suburban property owner, who was not served with electric light. In the front of the booth was a demonstrator motor and generator cut away to show the operation of the various parts. A Delco Light water supply system occupied a prominent position in

(Concluded on page 45)

The Contractor-Dealer

Report of Analysis of the "Overhead" or "Cost of Doing Business" of Six Separate Firms. Contractors' Overhead was 24.55%, Merchandising 30.2% of "Turnover"

A brief report on an analysis of "overhead" or "cost of doing business" was presented at the recent convention of the National Association of Electrical Contractors and Dealers by the general manager, W. H. Morton. The association recommended that the general manager continue his research work in this direction on a somewhat broader scale, and also that a special committee be empowered to take up an exhaustive study of "margin" with authority to take steps to correct any attending evils.

The report submitted is based on a personal investigation made by an accountant in the employ of the association. The investigation was undertaken for two reasons (1) to check figures already on hand and (2) in the hope of being able to obtain some segregation of overhead cost on the different classes of appliances sold by the contractor-dealer.

The investigation covered six different concerns located in six different cities and in three states. These were selected on account of their being recognized as trade leaders in their respective localities, at the same time having investments and total gross sales that were approximately alike. Extracts from this report are given herewith. It is of particular interest to contractors to note, that the average overhead cost of doing business in their branches of the industry figures out at 24.55 per cent. The overhead for the retailer is a little higher than this at 30.2 per cent. From this investigation, therefore, it would appear that electric equipment which is handled on a discount basis of 30 per cent. or less means a straight loss to the retailer, and the persistent plea of the latter that manufacturers and jobbers do not allow sufficient discount thus seems to be borne out. However, this is an average overhead. Certain electrical appliances on which there is a big turnover with a minimum of effort do not require so heavy a discount as the less readily saleable items. These are matters that have yet to be adjusted, and must be adjusted properly, we believe, before electrical merchandising can be established on a proper basis. The report follows, in part:

"The investigation emphasizes the necessity of continued educational work along the lines of Book-keeping and Cost Accounting, as only two of the concerns investigated were using double entry bookkeeping at the time the investigation was made although their records were such as to show their operations clearly.

"The detailed figures as to the operation of the separate concerns are unnecessary for the purpose of this report, but it is well to note that in each case they had been in business for some years, were well located in their respective cities, had well kept-up places of business and were managed by men who had a good knowledge of everything that was going on in their establishment.

"The figures included in the tables that form a part of this report clearly demonstrate that our previous figures, while approximately correct, evidently did not include all expense items and the figures herewith show overhead costs, which it is safe to assume present a true showing for our branch of the electrical industry.

"The investigation demonstrated that at the present time, it is impossible to obtain a segregation of overhead cost as applied to the sale of the different appliances handled by the contractor-dealer, as records are not kept in such a form as to permit the compilation of the figures without a very long and detailed examination of the entire business done by each concern, but we were able to segregate the overhead cost of 'Contracting,' in which term is included all sales involving productive labor, and 'Merchandising,' which covers sales not involving productive labor.

"It is evident, however, that the 'Merchandising' of electrical appliances to the public at the present time is largely carried on by concerns whose business includes the handling of appliances and materials without labor and also with labor and, from such segregation as it was possible to make in our investigation it is evident that the overhead costs of merchandising vary only slightly on the different appliances, except those requiring demonstration and service to maintain.

"It seems safe to assume that under existing business conditions, and probably for some time to come, retail distribution in the electrical trade will be carried on through channels that handle all branches of such retail trade and that consequently, we can take the position that the percentage of 'overhead' or 'cost of doing business' as shown by our tables for merchandising can properly be applied to the various items handled by the contractor-dealer in the course of his regular business.

"The following tables give in a condensed form the result of our investigation and they are, of course, supported by complete data from each of the concerns investigated:

Tabulated Results of Analysis of "Overhead" or "Cost of Doing Business" for the Electrical Contractor-Dealer.

"The tables show the average of six concerns, located in six different cities in three states, each doing a business of approximately $100,000.

Table of Total Business.

Item	Amount.	Percent. of Total Sales Billed.
Merchandise sales billed....	$400,192.98	64.
Contracting sales billed.....	225,114.92	36.
Total sales billed	625,307.90	100.
Selling expense	[illegible]	16.83
Administration expense	[illegible]	7.87
Accounting expense	[illegible]	3.51
Total expense	[illegible]	28.21

Table of Merchandise Sales.

Item.	[illegible]	Percent. of Merchandising Sales Billed.
Merchandise sales billed	[illegible]	100
Selling expense	[illegible]	18.66
Administration expense	[illegible]	8.09
Accounting expense .	14,058.88	[illegible]
Total expense	[illegible]	[illegible]

Table of Contracting Sales.

Item.	Amount.	Percent. of Contracting Sales Billed.
Contracting sales billed......	$225,114.92	100.
Selling Expense	30,549.58	13.57
Administration expense	16,813.20	7.47
Accounting expense	7,908.54	3.51
Total expense	$ 55,271.22	24.55

Note:—The Sub-division of expenses were made as follows:—

Selling expenses include Interest, Advertising, Commissions, Freight and Cartage, Discounts and Allowances, Travelling Expense, War Taxes, and a proportion of the following: Rent, Light, Heat and Power, Salaries, Telephone, Telegraph and Postage, Printing and Stationery, Miscellaneous Expense.

Administration expense includes Depreciation, Insurance, Legal Expense, Taxes, Maintenance, Bad Debts and a proportion of the last five items under selling expense.

Accounting includes Bonding expense and a proportion of the last five items under selling expense.

"It will be seen that the foregoing indicates the average overhead cost of doing business in our branch of industry to be 30.20 per cent. for merchandising; 24.55 per cent. for contracting, and 28.21 per cent. for the total business and we feel that it is safe to consider these figures as being conservative in view of our careful investigation and in view of the further fact that the investigation covered concerns that are probably above the average in their business methods.

"Comment on the question of the selling price in the 'Contracting' end of our business, is perhaps unnecessary, as the margin between the cost and the selling price is largely in the hands of the seller but the 'Merchandising' situation is certainly worthy of careful thought and some action on the part of the association.

"The figures in this report show that a discount of 30.2 per cent. only just covers the overhead cost and a further discount must be provided to enable the contractor-dealer to make a fair margin of profit on sales.

"This brings the merchandising question to the point where, if it is to be handled aggressively by the contractor-dealer, the margin between cost and selling price must be increased or the overhead expense must be reduced, and our investigation, as well as the figures obtained from other lines of retail trade, leads to the conclusion that the overhead percentage given in this report cannot be materially reduced without impairing the efficiency of the service rendered.

"Increased differences between cost and selling price can be brought about by a reduction in cost to the contractor-dealer or an increased price to the consumer.

"The first is beyond our province to comment on and in considering the second careful consideration must be given to the economic value of the goods to see that the price does not force them into the class of luxuries.

"On the other hand a continuance of the existing condition must, when thoroughly understood by the retailer, result in a lack of effort to increase distribution."

O Wad Some Pow'r the Giftie Gie Us
To See Oursels as Others See Us?

The Electrical Contractor from the Engineer's Standpoint

A Very Frank and Impartial Discussion of the Functions of the Various Elements in the Electrical Industry

The Toronto branch of the Ontario Association of Electrical Contractors and Dealers held their regular monthly meeting on November 9th. They were addressed by Mr. F. R. Ewart of the firm of Ewart, Jacob and Byam, electrical engineers, on the subject of "The Electrical Contractor from the Engineer's Viewpoint." In his opening remarks Mr. Ewart attempted to define the words "Contractor" and "Engineer." "It is necessary," he said, "that we understand just what a contractor is, and what an engineer is, before we can clearly visualize their relationship one with the other."

"Upon reference to a standard encyclopedia I find a contractor defined as 'one who performs a definite service.' Service, then, would seem to be the keynote of your calling. With reference to the contract itself, I find there is an extract from a work on international law which defines a contract as 'the highest act of the human free will.' Looking on a contract in that light it is obvious that it should be regarded as something sacred. In other words, a contract should be looked upon as a moral as well as a legal obligation, and the contractor should make every effort to fulfil the spirit of the agreement.

"We now come to the question of who is the engineer, that he should have any particular viewpoint regarding the contractor. Upon referring again to the encyclopedia I find an engineer defined as 'one who carries through some definite thing by skill and ingenuity.' The main function of the engineer is related entirely to these words, 'some definite thing.' Definite means specific, from which we get the word 'specification.'

Function of the Engineer.

"The function of the engineer then, in his relation to the contractor, is to reduce to the clearest terms the obligations of the undertaking, so that the contractor may know what is expected of him, and the owner may know what to expect for his money.

"In some cases you will find the engineer is an actual employee of the firm from whom you are seeking the contract. You feel then just the same as if you were dealing with the general manager of that company. The consulting engineer, however, is simply a temporary employee of his clients, for a fixed purpose. The temporary nature of his employment, however, and the fact that he conducts his business from his own private office, does not in any way alter the fact that he must regard himself just as much an employee of his client as if he were part of the permanent organization of that client.

Why Is a Contractor?

"The next outstanding question in my mind is, why is a contractor? Why does he exist? Chiefly, I should say, to fill an economic need. The way we live in this present day requires such people to fulfil the needs of our community life. The real big reason, in my mind, however, why the contractor exists, is for profit. The word 'profit' has been greatly abused, and for the last time I refer to the encyclopedia, where I find that profit is defined as 'the acquisition of good from labor or exertion.' Nothing to be ashamed of about that, then, is there? So I repeat, no matter what theorists may preach, the main thing in our present day commercial life is profit—reasonable profit. Now, in return for this profit, what are the elements of service which the public must expect from the contractor, and which the engineer in particular should expect?

What Should Be Expected From the Contractor?

"First, we expect that the contractor can supply materials necessary to complete the installation, and get them on the job promptly. There has been a great change in recent years in connection with the material situation, so that the jobber has become bigger and bigger and it is no longer necessary, from what I observe, for the contractor to carry a heavy stock in order to work expeditiously. The day may not be far distant when you can back up your Ford truck to the jobber's door and get sufficient half-inch conduit without any trouble.

"The second element of service which the contractor must be able to provide is that of the necessary workmen when and as required. Anyone in the electrical contracting business may occasionally find a journeyman electrician whom he can put on a small job, but on the large contract the contractor must carry sufficient men to enable him to put them on the job promptly. That is extremely important.

"The third element of service that is important is supervision by the contractor. That may not necessarily be, in many cases, the contractor himself, or his superintendent of construction, but someone who is responsible for the contractor's business must supervise the work during its progress, and be assured that it is being done thoroughly, without waiting for the engineer or someone else to come along and find something wrong and set up a 'holler.'

"Fourth, the contractor should keep proper accounts regarding his work. A big job varies considerably. Little things have to be added here and changed there during the progress of the work; extra wire, etc., may be required, and a proper system of keeping track of these things will enable the contractor, when settlement comes, to perform that important part of the service which is expected of him.

Some Specific Points.

"There are certain things that, in my mind, appear to have room for improvement. First, greater thoroughness is required. I know the contractor has many justifiable excuses for the men whom he has in his employ, but as I said before, the contractor gets the profit, and he must shoulder the responsibility. Ample help may be put on the job for the first five or six weeks, and by leaving a little here, and a little there, it is necessary to go over the entire job, so that the last five per cent. of the job takes up as much time in overhauling as it took to do the first ninety-five per cent. Some workmen on an electrical installation do their work slower, but having ability to put everything in place as they go along, they really get over the premises faster than the 'flash in the pan' fellows. What is desired is the combination of efficiency with speed. Sometimes it means extra men, and keeping them on the job for several days. The job should be put through in the minimum time in which it can be hammered across, without loss of efficiency.

"I mentioned a moment ago the necessity of supervision In some cases contractors do not supervise as consistently as they should. Perhaps they have too much work on their hands, and only get a few minutes at each job. One of the biggest points of all is the training of your workers. As far as the journeyman electrician himself is concerned, the responsibility is not entirely the contractor's. The electricians have a very estimable organization for the purpose of getting them a living wage, and they try to show you gentlemen why they should be paid well. It is the contractor's moral obligation, however, to see that these men have a maximum of ability to entitle them to that pay. You must train a man as a job foreman. In my observations, the number of men who have the qualifications of a job foreman are extremely limited. My own impression is that a man who is slightly lazy physically will frequently make the best foreman, because he is often more mentally alert. He would rather work a little harder with his brain in order to avoid physical exertion. If you can find that kind of fellow he usually makes a good job foreman. Suitable subjects, I will admit, are hard to find. Such a man should be paid well. The contractor can afford to pay him well, so long as he produces results.

Engineer's Duty to the Contractor.

"Now, with regard to what the engineer should do to help the contractor. First, the engineer should shoulder his own responsibility fully. While it is not my intention to criticize my profession, yet I am sorry to say that some men of our profession do not play a square game with the contractor. In making out specifications they try to insert clauses that put all the responsibility on the contractor. When an engineer accepts a fee from his client to look after a certain piece of work he should shoulder the responsibility. The engineer should know what size of wire should go into every place, and how this or that should be designed or laid out. The contractor should know what he is figuring on.

"Again, the duty of the engineer towards the contractor is to see that the latter gets a square deal throughout the contract from start to finish. Most engineers endeavor to do this. I am afraid, however, that there are occasional cases where engineers or their architectural brethren—who unfortunately sometimes have the writing of electrical specifications—look upon the 'stinging' of the contractor as an indoor sport. There is nothing to be gained in trying to trick a contractor into an agreement at a figure that will leave him without any profit. The engineer should know the cost and value of the work he is supervising. When he specifies a certain kind of material he should know the cost of that material. He should give general assistance throughout the work of the contract, and timely advice to the contractor as to what is meant here and what to do there.

"But, you may ask, why cannot the roles of contractor and engineer be combined in one person, or one organization. In some cases they can, but it might better not be, as I shall endeavor to show.

"The first point in that connection is simply this. If the job is of any magnitude, it entails a very considerable amount of detail work, and is worth a considerable amount of money. As the work that is to be done must be paid for, is it not better for the client or owner of the concern involved to know definitely what is to be paid for, and what he is paying for it?

"Again, the owner or the business man who has occasion for electrical service is deprived to a considerable extent of the benefit of competition. If a contractor is assured of the business all well and good. In that case there can be no competition. There are undoubtedly men of sufficient integrity that can handle both ends of the thing and give the owner as good value as otherwise, but there are other cases in which the owner will relish the benefit of reasonable competition. Competition, however, should be reasonable, and not to any cut-throat extent.

"Another point in connection with combination of the two functions is simply this, that the present day is becoming an age of specialization. Either of these functions of engineer or contractor are worthy of the fullest concentration. Neither of them can be done as 'side lines.'

"Again, if the contractor competes with the consulting engineer, he is making it harder for the latter to make a living. If there were more independent firms of engineers I contend there would be more contracts let per annum than at the present time. For example, before a manufacturer will undertake to scrap his old steam plant, etc., for model electrical installations he wants to know all about the cost of installation, the power consumption, upkeep, etc., and here is where the engineer in many cases can create business for the contractor. There are as many good reasons for co-operation between the contractor and the engineer as there are for co-operation between the contractor and the jobber. The functions of both the engineer and contractor are sufficiently large to warrant concentration. By proper co-operation the owner will get better value and better results; the contractor will in many such cases also reap a benefit in that he will come into the proposition at a time when all the multifarious detail will have been gone through, and when the 'pistol has been fired to start.' He would do his business with a much greater certainty of fair profit and possibly of greater annual turnover, and it would not be such a gamble as some of the jobs he undertakes under present conditions.

"If that is true, it might also reduce the cost of work without cutting into the contractor's fair and proper profit, and permit him to go ahead and enlarge the amount of business available.

"In many cases the contractor, in dealing direct with the owner is under a handicap of lack of confidence. The owner does not understand what is going on, and what he is getting. He is naturally suspicious that the contractor may be 'putting things over' on him. If he has the engineer—whom he employs usually on a basis of confidence in the first place—he looks to him for results, and does not worry so much about the contractor, and better confidence can be a big element in better business. As we get more specilization it is inevitable that the separate functions of engineer and contractor will become more generally recognized. The 'Jack of all trades' is becoming more rare, because of the danger of trying to take in too much territory. Let every branch of the electrical industry concentrate on its own line, making it as efficient as possible, and where possible help the other fellow to do the same."

The French Canadian Misunderstood

The luncheon meeting of The Electric Club of Toronto on Friday, November 19th, was addressed by Mr. L. I. McMahon of the Bell Telephone Company of Canada, Montreal. Mr. McMahon spoke on the subject, "The French-Canadian—His Contribution to the National Character," with an eloquence and enthusiasm that showed him to be an ardent admirer of many of the characteristics of our Quebec neighbors. The French-Canadian is polite, hospitable and truly cultured. Above all, he is passionately fond of, and proud of, his home, features which act to raise the moral standards of the province.

Hurrying Chippawa Development

In order to secure the completion of the work on the new Chippawa Canal by September 1st, 1921, the services of the hydraulic dredge "Cyclone"—said to be the most powerful dredge of its kind in the world — have been secured. The "Cyclone" will be used to remove 5,000,000 cubic yards of earth and rock. It is expected that the hydraulic dredge, with the assistance of electric shovels, will remove between 700,000 and 800,000 cubic yards of earth and rock monthly, thus cleaning up the work about July 1st of next year. Very satisfactory progress is reported in connection with the pouring of concrete at the new power house of Queenston, the construction work having advanced rapidly in the past few weeks. There are over 3,500 men working on the Chippawa Canal developments, besides a batch of the largest electric shovels ever built.

Various Opinions of the Electrical Contractor About Himself

Toronto, Dec. 8, 1920.

Editor, Electrical News:—

Mr. E. F. W. Salisbury's letter of November 20th, 1920, published in your December first issue, asks for expressions of opinion on the subject matter of his letter.

It is my opinion that the electrical contractor has been too long "spoon fed." My observations of the successful men in all lines of business is that they were able to fight their way up the ladder of success, without pampering and in the face of opposition. They, therefore, became strong. When the electrical contractor begins to sit up on his hind legs like a "he man" he is likely to be accorded the respect of manufacturer and jobber—and get his co-operation.

I cannot see why the jobber should be asked to furnish free education to the electrical contractor in matters pertaining to a business with which he is assumed to be familiar.

The electrical contractor should be willing—and glad—to pay for his own education. There are many sources available to him, including his association, if he wishes to learn—without excessive cost or an obligation to the jobber.

When the electrical contractor does his job, and impresses the jobber with his ability to handle his own business, then he is in a fair way to demand and receive the protection that is due him from the jobber.

The trouble with the electrical contractor is that he wants something and is not willing to pay the price for it.

Yours truly,
George J. Beattie,
Beattie McIntyre, Limited.

* * *

Toronto, Dec. 7, 1920.

Editor, Electrical News:—

The 75 per cent. of the electrical contractors which Mr. E. F. W. Salisbury refers to in his letter in the December 1 Electrical News, is that chiefly composed, I assume, of "one-man firms," i.e., the contractor who himself does all the buying, estimating, selling, etc., etc., as well as looking after the construction end and involving the labor of one or two to five or six men.

The limitations of this class of contractor are apparent. I would think. They do not need to bother about the "turnover" element in "overhead" because of the "point of saturation" corresponding to the capacity of the head of the firm. This, if overreached, results in loss rather than the "sure thing" extra profit of the "turnover" exponents.

I agree with Mr. Salisbury when he thinks "it's simply a matter of education." It is in the main; but is it in the way he suggests, primarily at any rate?

From my experience what such a "one-man firm" contractor needs is to get a good accountant, preferably a "one-man firm" with electrical experience, pay for his services, take him into his confidence and I venture to say it will be the contractor's own fault if he doesn't soon get around 100 per cent. efficiency in the "overhead" end of his business

The small contractor should be careful to keep all these merchandising, location, etc., ideas in their proper place and not be misled by good intentions, etc., because the better, construction man he is the less likely he is to be a good merchant. The inherent human qualities have such limitations that a good contractor and a good dealer "under the one hat" would really be a most extraordinary person and more than ordinarily gifted by nature.

I would suggest that the jobbers and manufacturers study the construction end, which they are "short" on, not with a view to educating the contractor but in order to give him less work, worry and loss in installing and making their goods serviceable to the public. The manufacturer and contractor have one solid point of contact in "labor" which should make it easier.

Yours truly,
Thos. Jackson.

* * *

Toronto, December 7, 1920.

Editor, Electrical News:

Mr. Salisbury's letter in your issue of December 1st, regarding the neglect of the contractor, is in some degree along the right lines, although we do not agree with him entirely.

The natural outlet for electrical appliances from the manufacturer to the jobber to the public is through the contractor-dealer. Surely we would not wish a return to the old way of the public chasing to the jobber or manufacturer for their electrical appliances. The education of the contractor in "keeping store" and of the public to buy from him is a good work, and has been a real benefit to us and to the public. The margins allowed are, as yet, far from being enough, but the trend has been in the right direction.

On the other hand, there is no doubt that many, if not most contractors, guess rather than estimate on wiring, with the result that many are doing work at cost price or less. The inevitable result is that they either go to the wall or drag out a miserable existence, and prevent others who do estimate correctly from getting work at a proper price.

We understand that part of the "Goodwin plan" was for the National Association to send lecturers out who would hold classes in estimating, but we have not yet heard of this being done. Certainly classes of this kind would greatly benefit the whole industry.

Yours truly,
R. A. L. Gray,
R. A. L. Gray & Co.

* * *

Toronto, December 6, 1920.

Editor, Electrical News:—

The writer has read with considerable interest Mr. Salisbury's letter published in Electrical News of December 1st. The present day condition of the electrical contracting branch of the industry is faithfully pictured and Mr. Salisbury's remarks are both timely and comprehensive.

A real service has been performed in thus giving publicity to the problem which confronts us. It is to be hoped that appreciation of its importance will bring in to you comments from Canadian electrical contractors from coast to coast.

On the surface it might seem that the Association of Toronto had devoted itself largely to the subject of merchandising to the neglect of contracting. Let us recall the last four years, however. In 1917 the Toronto Electrical Contractors' Association was organized; in 1918 the Association of Municipal Electrical Engineers re-organizeed; in 1918 Mr. Goodwin was brought to Canada by the contractors' association to further their organization of the entire industry. In the same year the T. E. C. A. expanded into an Ontario Association and affiliated with the National Association of Electrical Contractors and Dealers. In 1919 Mr. Goodwin again, and the manufacturers' and jobbers' associations were organized, and in 1920, for the first time in Ontario, all the electrical organizations co-operated in "The Electrical Banquet," with a view to promoting the electrical industry. During the year we have also seen Electrical Quebec and Electrical Manitoba organized. British Columbia has been organized for some years, and recently was rounded out by the formation of the B. C. Electrical Co-operative Association.

Now, if we recall, most of the talks have been on the great need for organization within the industry and now to go about it. In tackling any big job the site must first be cleared and permanent foundations laid. This has been in process for four years and the electrical contractor has performed no mean part in the operation. To-day, however, Mr. Salisbury's remarks are timely. We must learn now to apply modern business methods to the electrical contracting business. We have had enough of organizing. Let us get at our real work. The foundation is laid—let every member help to erect the superstructure.

Many electrical contractors spend much of their time bewailing trade conditions and wishing for Utopia. The association can be no better than its membership. The vast amount of time and effort heretofore required to secure attendance at meetings can be devoted to useful work if members will attend regularly and if each man will do the job assigned to him.

We electrical contractors have a wonderful opportunity if we will but apply ourselves. Our association affords the means and is favorably situated to serve because of its form and its very close affiliation with the National Association.

Provision is already made so that, if it prove advisable, the Toronto Association can be divided into sections specializing, for example, on "Contracting," "Motor Repairs" and "Merchandising."

The annual meeting takes place in January. An executive committee for Toronto district will be elected. If every member will do his part in 1921, he will be able to reap the benefits in dollars and cents before the end of the year.

As Mr. Abbott says, "When you have done all these things you have earned a reward. Go and get it."

Yours truly,
Kenneth A. McIntyre,
Beattie McIntyre Ltd.

Utilizing Lignite

The Commission of Conservation states that in Australia a syndicate has been formed "to mine, process and deliver" lignite throughout the Commonwealth. Mining operations are well under way, and the company has erected a pulverization plant in a suburb of Melbourne.

The process employed is briefly described as follows:

"The lignite is mined in either shafts or open cuts, the coal crushed on the spot to egg size, then hoisted to the air-drying tipples at the surface by bucket conveyors. After drying about seven days the coal is relieved of practically half of its moisture content and is ready for final treatment. This final process, which should be undertaken near the place where the fuel is to be used, consists of again crushing the coal—to about half-inch mesh—after which it is passed through a rotary drier, where the moisture content is reduced to about 10 per cent. The fuel is then pulverized, separated by air, and stored in bunkers.

"To use, it is blown through pipes, where it is mixed with air in quantity 10 per cent. in excess of requirements and ignited at the tip of an adjustable burner, which enables the length and width of the flame zone to be most accurately gauged. Boiler tubes and baffles are kept clear of ash by soot blowers, and suction conveyors carry off the ash to any desired place of disposal. Three per cent. of the power generated is required to operate the plant, and one experienced man can fire a whole battery of boilers or kilns.

"Under test the boiler efficiency was 80 per cent., the furnace efficiency 78 per cent."

A Successful Electrical Retailer Says :—

Use Window Cards in Every Display

They Pave the Way for Doing Bigger Business—If They Don't Always Make People Buy, at Least They Make Them "Think"

A prominent Belleville, Ont., electrical retailer recently showed a display card in his store window, bearing the words: "We don't want all the business, but we'd like to have yours." Such original statements as this draw attention to the retail electrical store, and make the man in the street think.

It was stated at a recent meeting of the Electrical Contractors' Association of Ontario that the average dealer does not seem to be aware of the possibilities in the use of window display cards. The subject might be classified under two headings, namely, general display cards and explanatory display cards. The example given above would come under the first named.

Let US solve your
servant problem

In wording display cards several things should be kept in mind. The message should have one or all of the following features: originality, timeliness, and the human appeal. The above example belongs to the latter category. It appeals to that trait in human nature that delights in being appreciated. We all believe that our patronage is worth having, but we like it when someone else says so. "The greatest study of man, is man," says Poe, and it is this truth that the electrical dealer should keep before him when planning pithy display cards for his window.

Does Your
STENOGRAPHER
write all your letters in
longhand?

———

Then why allow your
WIFE
to sweep the carpets with a
broom?

"Let Us solve your servant problem." Here is an appeal featuring timeliness. The subject is right up to the minute, and cannot fail to attract. It is one of the biggest problems facing the home, and any workable solution is welcome.

"Does your stenographer write your letters in longhand Then why expect your wife to sweep the carpets with a broom?" Here you present an idea to the mind of the man in the street that he may not have thought of before. If you were to accuse him of being indifferent to his wife's comfort and happiness he would be highly indignant, and yet here he is brought face to face with the fact that his stenographer's comfort and efficiency is given greater consideration than that of his wife. The objection might be made that this message is too long to be read. To overcome this the words "stenographer" and "wife" could be printed in large type, as shown in illustration, making a striking contrast that would catch the eye of the reader.

This machine will do
A Week's Washing
for the price
of your
Morning
Newspaper

Then there are those display cards which come under the explanatory heading. By explanatory, we mean a statement of fact, or an announcement of educational value. For example, take the following: "This machine will do a week's washing for the price of your morning newspaper." Here is a statement of fact, which has the added advantage of being original. It presents the question of power consumption in a new light, and brings out strongly, by means of a simple contrast, the wonderful cheapness in the operating cost of an electric washer.

"Prepare for winter! Get your electric fan." Here is an announcement of educational value. The large majority of people never associate electric fans with winter. Here's your opportunity to state a few facts about their winter uses, as shown in illustration, thus educating the householder and increasing your own business.

With regard to the making of window cards, it is not necesary to be an expert in order to have attractive cards. Unless on special occasions, the average dealer can quite easily make his own window cards. All that is necessary is to have a set of letter pens, good brushes and some waterproof drawing ink, and a little practice. The pens to use are Esterbrook Speed Lettering pens. Nos. 2, 3, or 5. The best brushes are red sable, chisel edge, in sizes Nos. 6, 8, 10 and 12. No. 6 makes a stroke one-eighth of an inch wide; No. 8, three-sixteenths of an inch; No. 10, one-fourth of an inch; No. 12, five-sixteenths. For cardboard use white, six or eight ply, bristol board, coated on one side. This board comes in sheets 22 by 28 inches. Cut these in halves, quarters and eighths for standard show card sizes. The lettering pens have round bills that rest flat on the paper and give all the strokes the same thickness. The illustration shows how each letter is produced with these pens. Each letter must be studied carefully and then practiced with a pencil till it can be produced from memory and until you naturally break it up into its proper parts. Each stroke is numbered and the strokes should always be made in the direction indicated by the arrows. Of course, perfect letters cannot be made at the first trial, but practice will produce good window cards and no artistic ability is necessary.

Prepare for Winter!

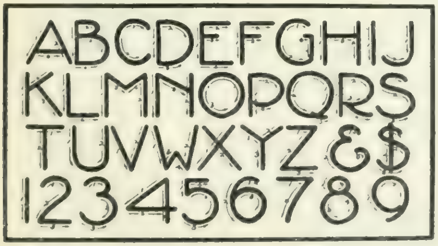
Get your

ELECTRIC FAN

for

(1) Equalizing your room temperatures.
(2) Getting the most out of your coal.
(3) Improving draft in your furnace when it is backward.

A useful scheme for the dealer who wants to change his window cards frequently and to waste as little time as possible in making them, is a rubber stamping outfit. Outfits of this kind can be procured with alphabets and sets of figures in different sizes to suit individual preference. Anyone who is handy with a paint brush can produce varied color effects very simply by painting over the outlines made by the stamps. An artistic effect can also be obtained by sprinkling gold dust over the letters or figures while still wet. The moisture will cause the dust to adhere and the letter will show up very prettily in gold. Care has to be taken in this case to use just enough ink to hold the dust without saturating it and changing its color. Silver dust can, of course, be used in the same way. One cannot expect to get as artistic and distinctive results with a rubber stamp outfit as with lettering done by an expert show-card man, but a neat card can be produced on short notice and with small expense.



Do your own lettering.

Here is the "Hardware" Bogey Once Again

The representative of a large firm manufacturing a well-known electric household utility, in conversation with the writer recently, expressed the opinion that unless the electrical contractor-dealer in Canada bestirred himself and launched out on a real merchandising and educational campaign, that the retailing of electrical merchandise, to which he is the rightful heir, would pass to the hardware and drug store merchant, who, whatever their failings, knew how to merchandise. He stated it as his opinion that the hardware stores were among the best customers the jobber had, while the electrical dealer was too often among the worst. This condition, he said, would have to change if the electrical dealer was to come into his own. While admitting that up to a certain point the manufacturer and jobber were responsible for educating the dealer to be a merchant, yet, he pointed out that these gentlemen were, like the dealer, in business primarily for profit, and that it was natural they should take advantage of the best outlets for their products.

When asked what he thought was the chief impediment to the progress of the electrical dealer, he replied "lack of specialization." It was his opinion that the average dealer tried to handle too many lines, and too many kinds of each line. For example, he stated that the average small dealer made a great mistake in trying to handle electric fixtures, vacuum cleaners and washing machines in the same store. It would be much better for him to specialize either on electric fixtures or on general household appliances, but that very few had the time or money to handle all these lines with success.

With regard to washing machines, he said that few deaeers could handle more than one make of washing machine and do justice to himself or his products. Statistics had proven that the greatest success was made when the dealer backed only one type of machine and put all his effort, time and money behind that machine. While in some few instances the dealer might lose a sale through not handling the particular machine the customer was interested in, this, he said, was a "drop in the bucket" when compared with the steady advance in business and increased profits which accrued to the dealer who was known in his district as the expert service station for one make of electric appliance. Not only that, but the exhibition of a goodly number of one kind of appliance in his store was the best advertisement a dealer could have. It looked prosperous, and people naturally concluded that there was a big demand for this particular appliance, and it is remarkable how prone human nature is to be popular, tobe "in the swing." On the other hand, if the dealer had just one machine in the store, surrounded by a host of other appliances it gave the appearance of the "pedler" dabbling in side lines, and made the public suspicious of the dealer trying to "put something over."

He also expressed the opinion that the present "hard times" scare was a bubble which the electrical dealer could burst whenever he made up his mind to educate his constituents to the fact that there would be no appreciable reduction in the prices of the majority of electrical appliances, with the cost of raw material increasing, and high wages being the order of the day.

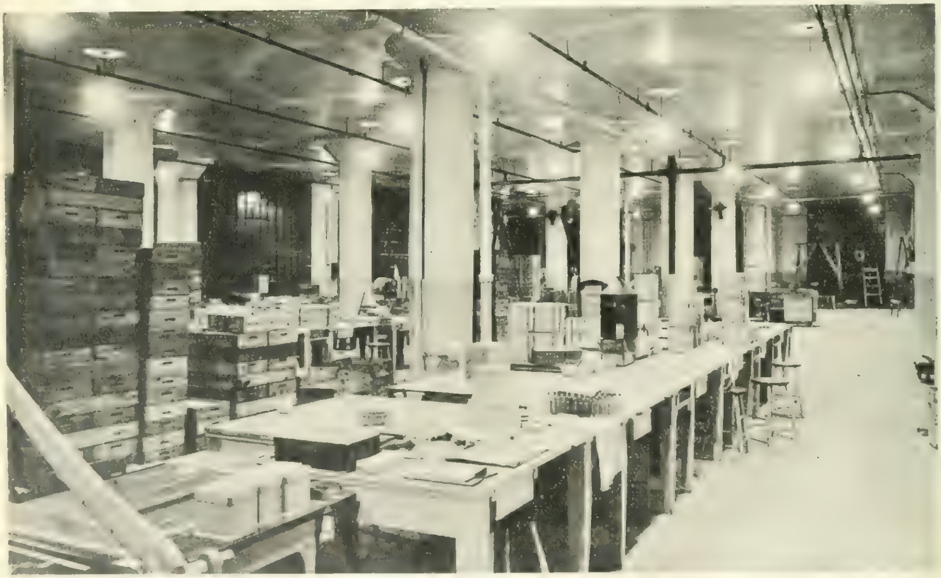
Lord Leverhulme Believes Good Factory Lighting is Fine Investment

The photograph below pictures the result of a complete investigation into the lighting of their factory, by Lever Bros. Ltd., and especially by Mr. James Mess, the general superintendent, Mr. Tyndall, manager of the Mechanical Trades Company, who did the electrical construction work, and the Wm. F. Sparling Company, who were the architects and designers for the complete work. A unique problem was encountered in the lighting of this plant inasmuch as while ordinarily 300 watt lamps would have been used, it was impossible to employ such a high wattage in this case. 200 watt lamps were the size determined upon, and it then became a matter of careful study and search for the most efficient industrial reflector or lighting unit for the purpose. The company claim they have obtained the desired results in the Amco units used as shown in the illustration. The bays are 400 sq. ft. and two outlets are installed in each bay, equipped with Amco lighting units and 200 watt lamps. The units are mounted 16 feet from the floor, and the foot-candle reading on the table shown in the picture is 8 foot-candles. This photograph was taken under regular lighting conditions, and the exposure was less than one and a half minutes. The photographer stated that it is quite usual to give photographs of artificial lighting an exposure of upwards of twenty minutes, and the production of the photograph as shown herewith is testimony to the efficiency of the lighting units, also to the fact that these units effectively screen the eye and the camera from all direct glare from the lamp.

Owing to the ceiling being white enamelled and the lighting units also white porcelain enamelled, there is a lack of contrast in the upper part of our illustration and the lighting units are singularly inconspicuous. It is quite possible for a visitor to go through the factory on a trip of inspection and come away without noticing the lighting fixtures at all. This very desirable condition which leaves the eye so little conscious of the light source, also makes it difficult to show up the units in a photograph.

This installation of good lighting in the plant of Lord Leverhulme has all the greater significance in view of the generally recognized fact of his unusual consideration for the welfare of his employees. He realizes that best lighting also means best efficiency and most pleasant working conditions.

This installation was made through the medium of Mr. Frank T. Groome, 1710 Royal Bank Bldg., Toronto, who holds the Canadian agency for the Amco unit.



Lord Leverhulme's factory, Toronto.—Note the lack of shadows and the splendid illumination on the work tables

New Home of Electric Appliance Department of Winnipeg Electric Railway Co.

Winnipeg Electric Railway Appliance Department

This photograph shows an interior view of the new home of the gas and electric appliance department of the Winnipeg Electric Railway Co. Prior to moving into these commodious premises, the department was located at 322 Main St., Winnipeg. Increased business immediately following the transfer indicated that the move was a right and progressive one. The department is under Mr. M. L. Kane and the gentleman in charge of the appliance showrooms is Mr. L. L. Price. Practically the whole of the ground floor of the Electric Railway Chambers is occupied by the new showrooms, and the company reports increasing business.

The electric appliance business in Winnipeg has enjoyed a wonderful period of prosperity, in which the Winnipeg Electric Railway Co., by its progressiveness, has had full share. It is the unanimous opinion of all appliance dealers that with Winnipeg so fast becoming such an "electric city," the "trade" will develop even more rapidly in the future.

Vancouver's Electrical Show

(Continued from page 36)

the booth while electric washers and household appliances all operated from current supplied by the Delco Light, were daily demonstrated. A Kilbourne & Clarke 550 watt wireless set was in the left front corner and was in operation throughout the show.

The Bluebird Washing Machine Displayed.

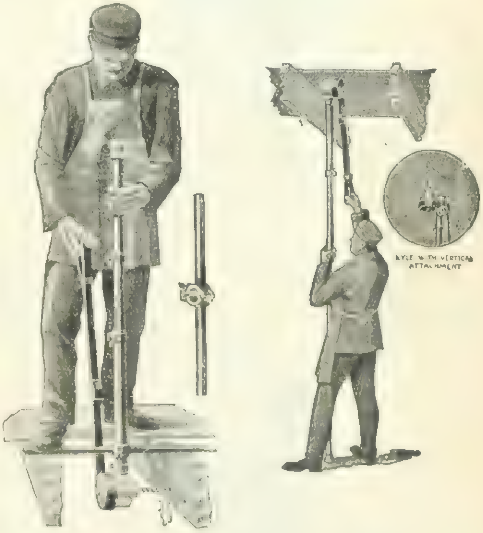
The Electric Shop shared a booth with the Modern Utilities Ltd. and featured a Bluebird Electric Washer with excellent results.

Features McClary's Electrical Appliances.

A handsome booth featuring McClary's electric ranges with the new heating plates with the element embedded in cement was in charge of W. W. Fraser. As electrical ranges seemed to share honors with electrical washers during show week, this booth received great attention. Irons and toasters were also prominent.

The "Kyle" Boring Device

A boring device known as the "Kyle" has been developed by the Canadian Hykon Company, 55 St. John Street, Hamilton, which it is claimed has many advantages over the old chain pull tool. The "Kyle" is operated by a ratchet arrangement with a strap drive, which, it is said, makes it stronger, speedier and more compact.



The Salisbury Electric Company, [illegible] Street, Toronto, have been awarded the contract for electrical work on $17,000 addition to garage at [illegible] Yonge Street, Toronto.

What is Newest in Electrical Equipment?

An Electrical Branding Iron

An electrically-heated branding iron has been placed on the market by the Detroit Electrical Branding Iron Co., 710 Farwell Building, Detroit, Michigan. The iron, which has a large heat-storage capacity, requires 40 minutes after turning on the current to bring the branding surface to operating temperature. When this temperature is reached, it is maintained continuously, and twelve brands a minute can be made on material of average specific heat. When greater heat is required for certain materials, the evenness of the brand is taken care of by the length of time for which the brander is applied. A spring suspension can be used to take up the weight of the iron when in constant use.

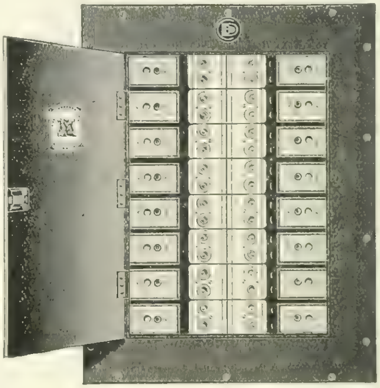
The heating element of the iron is ruggedly built, and is insulated with magnesium asbestos and encased in a substantial housing. It can be operated in any position, eliminating fire hazard and increasing the speed with which the work can be done.

A Rotary Cloth Cutter

The illustration shown here is that of the Midget rotary cloth cutter manufactured by the Eastman Machine Company, Washington & Goodell Streets, Buffalo, N.Y., and is [illegible] one-half inch in height. The machine is compactly constructed, the illustration being one-third the actual size of the machine, and is claimed to take up no more room than a pair of shears. The disc cutting blade is driven by a worm gear, direct connected to an electric motor and kept clean and sharp by automatic sharpeners. The motor operates on either alternating or direct current, and can be attached to any electric light socket. It is claimed that by the use of this machine time is saved, and liability of error and waste eliminated. It is particularly adapted for use in merchant tailoring, tailor-to-the-trade, and dressmaking establishments. It can be used for work on aprons, awnings, bags, corsets, caps, hats, cloaks, suits, clothing, dresses, knit goods, kimonas, over-gaiters, pants, shirts, shoes, muslin, underwear, waists, wrappers, jackets, skirts, etc., where shears have heretofore been used.

New Dead Front Panel Cabinet

The illustration shows a new dead front panel cabinet manufactured by the Canadian Drill and Electric Box Company, 1402 Queen East, Toronto. It is made in either bush or furnace type, dead black finish with gutter. The capacity is 10 amperes, 110 volts per circuit, and can be made in any number of circuits.



Largest Transformers

What are said to be the four largest transformers in the world, each of which has a capacity of 23,600 kv.a. or 35 per cent. greater than any single-phase transformer heretofore constructed, were recently completed by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, and shipped to the Cheswick Station of the Duquesne Light Company. The transformers at this station will be arranged in one bank of three with one spare for use on occasions of necessity. The transformers will step up to the output of a three-element 70,000 kv.a. steam turbine, from the generating voltage of 11,500 to a transmission voltage of 66,000. Provision is made so that when this generating station reaches its ultimate capaciay the transmission voltage may be increased to 132,000 volts. This will be necessary owing to the tremendous amount of energy which will be generated at the station. Each of the transformer tanks has a diameter of nearly 10 feet and is approximately 16 feet high. With the bushing in place the total height is over 22 feet, measured from the wheels of the truck upon which the tank stands to the tip of the bushings. Each of the transformers weigh 63 tons when filled with oil, there being something over 18 tons of special high grade oil required for each transformer.

Utility Motor Mounted on Substantial Tripod Base

For use on farms and other places supplied with 32 volt energy, the Westinghouse Electric & Manufacturing Company, has just placed upon the market a ¼ h.p. electric power stand. This portable motor enables the maximum use to be had from a farm lighting plant—power as well as light being thus available. The motor is mounted on a substantial tripod base. A telescopic rod is provided to brace the motor and to obtain the proper tension for the belt. The rod is secured on one end through convenient holes provided in the base and the motor frame. The handle on top of the stand makes it easy to be carried from place to place. The main shaft speed is 2100 r.p.m. and the back-geared shaft turns at 250 r.p.m. There are two pulleys on each shaft, a 6⅝ in. flat pulley and a 2¾ in. grooved pulley being permanently attached to the slow speed shaft. A 1½ in. flat pulley and a 2 in. grooved pulley are supplied for the high speed shaft. These two pulleys are fastened onto the shaft by a set of screws. The flat pulleys take a 1 in. flat belt and the groove pulleys take a ⅜ in. and a 5/16 in. round belt on the slow and high speed shafts respectively. Some of the many uses to which this tripod utility motor can be put to save much labor and time for both the farmer and his wife is by driving the following: grindstone, feed grinder, root cutter, water pump, horse clippers, fanning mill, clothes washer, cream separator, butter churn, sausage grinder, food cutter, and ice cream freezer. Many devices can be equipped with this back-geared motor mounted permanently. For permanent mounting a standard sliding base is supplied.

Cone Shaped Christmas Tree Lamp

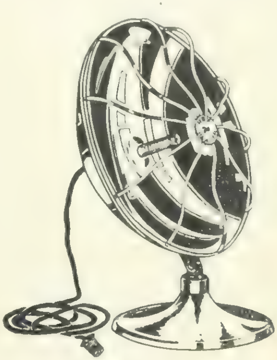
A Christmas tree lamp designated as C-6, and having a coneshaped bulb ¾ in. in diameter and 1½ in. in length has been placed on the market by The Westinghouse Electric & Manufacturing Company. This replaces this company's G-8 lamp. The new bulb has more of the shape and size of the flame of a candle, thus giving a better decorative effect. The lamp, instead of having a transparent coloring, has a so-called "matt" finish which has an increased diffusing effect and makes the lamp attractive when unlighted as well as when illuminated. The lamps are made in colors of red, orange, green, blue and white.

A "Midget" Electric Iron

The Northern Electric Company, has just placed on the marked a "midget" toy electric iron for children. The iron can be used for ironing doll's clothes and will not heat up enough to cause damage. The base of the iron consists of an iron casting, and the top is made of sheet steel the whole being heavily nickeled to provide a smooth ironing surface and top. A cord is attached to the iron and may be connected directly to the house lighting socket or the base or wall outlet. The weight of the iron is 1¼ lbs. and the current consumption is 27 watts.

The Rex Heater

Cope & Son, Ltd., Vancouver, are manufacturing and distributing their new "Rex" heater which, though but recently put on the market, is enjoying great popularity in the coast province. Many original improvements are incorporated in it. It has a swivel joint, allowing the reflector to be turned in any direction without the movement of the base. The guard is attached to the guard-rim by pressure, without the use of solder, thus doing away with the annoyance of loose guard-wires. The back of the reflector is of double construction, the outer shell being ventilated to allow a draft of warm air to circulate through the element core, which is hollow. The heating element, which is guaranteed for one year, is easily removed by loosening two small screws in the back of the heater. These heaters are being turned out at the rate of fifty per day.

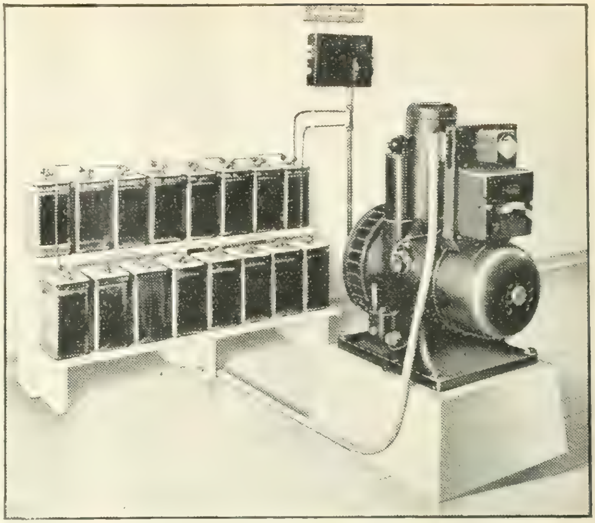


Handsome Portables

A handsome booklet is being distributed by Baetz Bros., of Kitchener, describing their line of portable electric lamps and silk lamp shades. The illustrations are in color and present a splendid array, from which the dealer may choose a varied and attractive stock. The booklet, which is known as catalogue No. 5, may be had on application to Baetz Bros. at Kitchener, Ont.

The Canada Gazette reports the incorporation of the Perkins Ladd Electric, Limited, with head office at Montreal, Que., for the purpose of manufacturing and dealing in all kinds of electrical machines, appliances and accessories, the capital stock of the company to be $75,000.

The "Dominion Light" for the Farm, Summer Home and all Isolated Points



The illustration shown here is that of the "Dominion Light," made by the Dominion Steel Products Company, Ltd., Brantford, Ontario. Dominion Light is a compact lighting and power unit comprising single cylinder, four-cycle engine, direct current electric generator, fuel and lubricating oil tanks, and electric switchboard. This unit, together with a 160 ampere-hour storage battery, forms the complete equipment. The unit is especially applicable for farm lighting, but is also suitable for summer resorts, hotels, stores, churches, schools, and as an auxiliary light and power plant for manufacturing establishments. The company publish an interesting illustrated booklet entitled "Light," giving among other valuable information, the following condensed specifications: Rating, 1,000 watts; height, 36 ins.; weight, without battery, 532 lbs.; engine horse-power, 2¼; bore, 2⅞ ins.; stroke, 5½ ins.; speed (under load), 1,000 r.p.m.; splash oil system; self-cranking; air cooled. As a typical load the battery will carry alone, when fully charged, twenty-five to thirty 25 watt lights burning brightly for eight hours, or thirty to thirty-five 20 watt lights for eight hours. With engine running, any of the following may be carried indefinitely, fifty 25-watt lights; sixty 20-watt lights; two half-horse-power motors; one half-horse-power motor and thirty 20-watt lights, or one half-horse-power motor and an electric iron. The engine will run equally well on either kerosene or gasoline.

The American Ironing Company of Canada

The American Ironing Machine Company of Chicago are establishing a Canadian branch at Woodstock, Ontario. A lease for one year has been secured of the factory known as the Woodstock Worsted Knitting Company, with option of purchase at the end of that time. It is planned to begin installing machinery in March next, and to start production as soon thereafter as possible. The company makes an electric ironing machine for domestic use, and claims to have distributed 270,000 in the United States since the organization was started in 1905. During the war the company manufactured patent tapping chucks for the British Government. The Canadian company will be known as the American Ironing Machine Company of Canada, Ltd.

Winnipeg Activities

Mr. J. E. Gilmour, President of the Electrical Contractor Dealers' Association, reports that the contractor dealers are now well organized, and one of the most wide awake associations in Western Canada to-day.

Meetings are held every Thursday evening from eight to ten, and the attendance is growing weekly. The members are very enthusiastic and optimistic, although realizing that success is going to mean a lot of hard work. Several committees have been appointed to handle the various subjects as they come up. All dealers are strongly in favor of the Goodwin Plan, and believe it will be very beneficial to the Trade in Winnipeg.

Mr. Gilmour, speaking of the recent convention, said he considered it was a great success and has already paid for itself a good many times over. Apart from the business end of the convention it has been the means of bringing about a feeling of good fellowship amongst the members of the association.

Dimmers for Theatres, Clubs, &c.

The Ward Leonard Electric Company have issued an interesting booklet describing Vitrohm vitreous enamelled dimmers for use in theatres, lodges, clubs, etc. The booklet is illustrated and the equipment and its installation very carefully explained.

Modern Ways for Modern Days

The Westinghouse Electric & Manufacturing Company have issued a very attractive little booklet, entitled "Modern Ways for Modern Days." The illustrations are of household appliances, shown in most attractive colors, and with each is a short explanatory paragraph drawing attention to special important features. It is a most timely booklet, coming out as it does just before the Christmas trade.

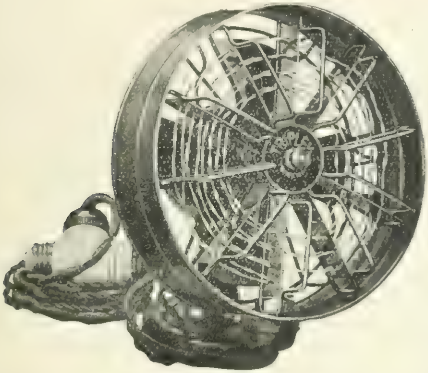
Show Names of Satisfied Users

In demonstrating electrical appliances it has been found that a good practice is to place a card in the window bearing the names and addresses of several owners of these appliances. This is practically inviting the prospective buyer to call on any or all of these people with a view to satisfying herself as to the merits of these appliances. It inspires confidence in the product. Another good way would be to have a separate card for each name, using several different colors of ink, and putting a different card in the window each day. This, while taking a little more time and labor, has the added advantage of being more original, and arrests the attention of the passer-by. This method will have the effect of making those who pass the window pay more attention to the names and addresses when they are thus presented one at a time. In case any customer should be likely to object to this publicity, it might be well to get in touch with them and obtain their consent to use their names for this purpose.

The first demonstration on this continent of the teleostereograph, the invention of Edouard Belin of Paris, which telegraphs photographs, was held recently, when four photographs were wired between New York and St. Louis. Each of the pictures went the 1,000-mile route in about eight minutes, the negative being reproduced with distinctness.

Combination Fan and Heater

The Triplex Model G-20 combination fan and electric heater shown here is designed for residence use and consists of a standard 6-inch electric fan and the special Triplex heater. The heater attaches to the guard of the fan and provides a 640-watt nichrome coil heating element through which the air blows the heat out into the room, in this way circulating the heated air about the room and quickly raising the temperature. It attaches to any socket, plugs in with a current tap, giving independent connection to fan and heater. The uses claimed for the Triplex are many. It can be used to temper a chilly room, warm the bathroom or nursery. It will dry the hair, dry clothes in the laundry on rainy wash days, dry baby things in the nursery, dry vegetables or anything else. If placed in the garage in cold weather it will quickly warm up the engine of a motor car before starting. The Triplex also has many commercial and industrial uses, such as in hotels, hospitals and theatres for quick emergency. It can also be used for drying tobacco, spaghetti, photographic work, printing, oils and other products where a rapid well controlled drying heat is required. Larger models for industrial uses can be supplied up to 3 kw. heaters. The manufacturers of the Triplex are the Thermo-Fan Electric Co. of New York, distributing agents being the S. O. S. Electric Sales Co., Columbus Circle, New York.



Capt. Reg. T. Smith, who has just opened an office for the Benjamin Elec. Co. at 311 .Confederation Life Bldg., Winnipeg

New Books

"Interior Electric Wiring and Estimating"—A practical treatise on methods and systems of wiring, illustrated by typical installations, and the planning and estimating of actual wiring jobs, by Arthur L. Nelson, Superintendent, Interior Wiring Department, Commonwealth Edison Company, Chicago; American Technical Society, Chicago, publishers. This book treats the single subject of interior wiring, without mention of outside distribution or electric lighting and it applies the principles to specific examples, in which the actual estimates used on several important buildings are given. The wiring of electric signs is also covered in detail. A feature is a number of blue-print plans enabling the student or the practical workman to form a true idea of the methods used in this important branch of work. The book is divided roughly into three sections: Methods of Wiring; Typical Wiring Installations, and Estimating Wiring Installations.

"Engineering Electricity," by Ralph G. Hudson, S. B. Assistant Professor of Electrical Engineering, Massachusetts Institute of Technology; John Wiley & Sons, New York, publishers. This book has been written primarily for technical students, not specializing in electrical engineering, but may well serve as an introductory text for electrical engineering students. The following chapter headings will indicate the scope of the work: Direct Current Circuits; Electromagnetism; Electromagnetic Induction; The Direct Current Dynamo; Direct Current Measurements; Alternating Current Circuits; Alternating Current Measurements; Three-phase Alternating Currents; The Alternating Current Transmission Line; The Synchronous Generator; The Synchronous Motor, The Synchronous Converter; The Mercury Arc Rectifier; The Transformer; The Three-phase Induction Motor; The Alternating Current Series Commutator Motor; Illustrations of Electrical Apparatus.

"Hydro-electric Development in Ontario," a history of water power administration under the Hydro-electric Power Commission of Ontario, by E. B. Biggar; the Ryerson Press, Toronto, publishers. The scope of this work is shown by the following chapter headings:

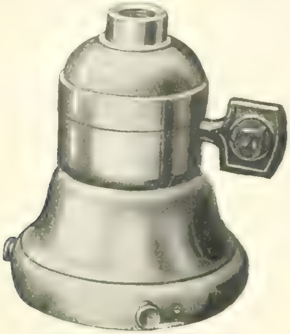
General Principles—Public Ownership of Public Services; Power Resources of Canada and the United States, Eighth Wonder of the World Revealed at Niagara Falls; The Apostles of Power and their Missions to Niagara; The People's Claim to the Public Resources; and the Struggle for the Control of the Niagara; Genesis of the Hydro Electric Power Commission—Reports of the First Commissions; The Situation at Hamilton; The Permanent Power Commission and its Constitution; Organization and Development; Evolution of the Electric Power Federation; Toronto's Struggle for Self-government—The Power and Lighting Problem; Organization of the Toronto System; The Electric Railway Era and its Significance to Canada; The Electric Railway Act; Niagara Power on the New York Side; Electricity on the Farm; The Power Problem of the St. Lawrence; Fiat Justicia—The Commission and the Law; Review of Present Operating Conditions; Sir Adam Beck.

The book includes an appendix which contains the following sections: The Laboratories, Shops and Inspection Departments of the Commission; Water Power Leases; The Power Systems; Other Provincial Power Commissions; Financial Summary; Bibliography.

The Benjamin Electric Manufacturing Company of Canada, Limited, are issuing a booklet entitled, "The Panel Board Message." It contains, with illustrations, descriptions of the Benjamin-Starrett standardized panel boards and cabinets.

A New Shade Holder

The husk attachment shade holder shown here has just recently been placed on the market by the E. H. Freeman Electric Company of Trenton, N.J. It is designed for supporting a shade from a standard receptacle. It is claimed to be as simple as screwing in an electric bulb to attach a "Waterbury" husk to a fixture. The husk can be used wherever there is a socket with the thread at the end, and wherever a shade is needed. It eliminates loose holders and wobbly fixtures and brackets.



Personals

Mr. H. A. McLean, Sarnia, has been appointed manager of the Moose Jaw Electric Railway Company, Moose Jaw, Sask.

Mr. A. H. Dion, manager of the Moose Jaw Electric Railway Company, Moose Jaw, since the formation of this company, has resigned.

Mr. Thos. H. McCauley, general manager of the New Brunswick Power Company, and formerly, for many years, manager of the Calgary Municipal Railway System, has resigned his present position, resignation to take effect March 1, 1921.

Mr. A. B. Lambe addressed the Ottawa branch of the Engineering Institute of Canada recently on the subject, "The Common Street Car." Mr. Lambe referred specifically to the one-man safety car type, which he greatly favored. Mr. G. B. Dodge, chairman of the branch, presided.

Mr. K. J. Dunstan, manager of the Ontario Division Bell Telephone Company, has been appointed a vice-president of the company. His appointment is made in appreciation of the growing importance of the Ontario division, and the necessity for having a high executive officer in charge of the field.

Mr. G. H. Walters, who has been chief operator for many years in the Toronto office of the G. N. W. Telegraph Company, was recently presented by his colleagues with a solid gold watch and a travelling bag on the occasion of his departure to take up the position of superintendent of the company's Montreal office.

Mr. W. H. Winter, president of the Montreal Electrical Club has been appointed a member of a committee formed to promote a movement for the erection of a large hall for convention, exhibition and concert purposes in Montreal. Mr. Winter was one of the speakers at a meeting held at the Windsor Hotel, on November 22nd, when he promised support, on behalf of the luncheon, to the movement.

Mr. R. G. Harris, of the Standard Underground Cable Company of Canada, Limited, Montreal, has been transferred from Montreal to Pittsburg, U.S.A., to assist in the development of the export trade of the above company. Mr. Harris was a well-known figure in Montreal electrical circles for the past eight years, and his many friends will join us in wishing him every success in his new field of endeavors. Mr. Harris is leaving for Europe shortly in connection with his new duties.

Mr. J. A. Mochon has been appointed secretary-manager of the Electrical Co-operative Association of the Province of Quebec, and has resigned his position in the Electrical Department of the City of Montreal. Mr. Mochon, however, will still retain his position on the Provincial Board of Examiners in connection with electrical licenses. The main object of the Co-operative Association is to promote unity between the various electrical interests, and also to give an impetus to the use of electrical products throughout the Province. An office has been taken in the Drummond Bldg.

Mr. R. V. Perry, late senior partner in the Electric Supply Co., Vancouver, has severed all connection with that firm and has opened a new store at 1150 Granville Street, where all the latest and most approved electrical fixtures and appliances and labor-saving devices for the home are stocked. Mr. Perry had been with the Electric Supply Co. for eleven years, opening the business in partnership with Mr. Chas. Peacock and later forming a limited stock company. The new store was opened on Nov. 12th and the "Electrical News" joins with his many friends in wishing the best of luck and the greatest success to Mr. Perry, whose integrity and courtesy in his dealings with the public is a byword in the coast city.

Mr. W. G. Murrin, assistant general manager of the B. C. Electric Railway Company, Vancouver, who was recently elected to the presidency of the Vancouver Canadian Club, was born in London, England, in 1875. He received his education at the Royal Naval School, Greenwich, and the Finsbury Technical College, London. Prior to coming to Vancouver in April, 1913, he was works manager of the London United Tramways Company and electrical engineer for the same company. On joining the British Columbia Electric Railway Company he was appointed mechanical superintendent. He was made assistant general manager in 1917. He is past president of the Vancouver Returned Soldiers'

W. G. Murrin, Asst. Gen. Mgr. B.C.E.R. Co.

The Harvey Hubbell Company of Canada, are distributing a folder entitled "Paraline." This is the new Hubbell plug caps with the blades that turn.

Current News and Notes

Brantford, Ont.

The Electrical Co., Limited, 376 Dufferin Street, Toronto, recently purchased the A. C. Spark Bldg., in the Homedale section of Brantford and will move their plant from Toronto to Brantford, where they will continue to manufacture dairy machinery and electric motors up to 5 h.p.

Grande Prairie, Alta.

The plant of the Grand Prairie Electric Co., will be taken over by the local town council on January 1st, 1921. An additional power unit consisting of a 75 h.p. crude oil engine will be purchased in the early summer of 1921, together with exciter, generator and additional transmission line equipment.

Halifax, N. S.

Messrs. Arthur & Conn, Argyle Street, Halifax, have been awarded the contract for electrical work on $35,000 warehouse under construction at Upper Water Street for Pilkington Bros.

Hamilton, Ont.

The Ontario Gazette reports the incorporation of the Hamilton Storage Batteries, Limited, with head office at Hamilton, Ont., for the purpose of manufacturing and dealing in storage batteries and motor accessories. The company are capitalized for $30,000.

Hull, Que.

The Hull Electric Railway has made application to the Railway Commission for a new tariff of fares. Mr. G. G. Gale, vice-president of the company, states that traffic on the company's lines has decreased and this, together with the increased cost of operation made an increase in fares necessary.

Ioco, B.C.

Contract will be let for electrical work on 84 houses being built at Ioco by the Ioco Employees Housing Co., at an estimated cost of $50,000. Architects, Blackadder & McKay, North Vancouver, B.C.

Kemptville, Ont.

A by-law has been passed by the ratepayers of Kemptville authorizing the local council to borrow $25,000 for the building of a new Hydro distribution system.

Kitchener, Ont.

Mechanical Trades Co., 54 University Ave., Toronto, have been awarded the contract for electrical work on $250,000 theatre being erected at Kitchener, Ont., by the Paramount Theatre, Ltd.

Passenger rates on the Waterloo & Wellington Electric Railway between Kitchener and Bridgeport were recently advanced in accordance with a ruling of the Dominion Railway Board,. The new fare is 10c cash, or twelve tickets for $1.00. This rate will be in force until March 31st, 1921, and applies on all traffic past Lancaster Street.

Milton, Ont.

Mr. E. F. Earl, Milton, Ont., has been awarded the contract for electrical work on $75,000 high school being erected at Milton.

Montreal, Que.

The Canadian Comstock Co., Limited, 10 Cathcart Street, Montreal, have been awarded the contract for installation of electrical and mechanical equipment at the $280,000 factory erected at Van Horne & Park Ave., Montreal, by Messrs. Bovril, Limited.

Mr. O. Labelle, 43 Garnier Street, Montreal, has been awarded the contract for electrical work on $150,000 apartment house being erected at Vendome & Sherbrooke Streets by Mr. John Dominique.

Mr. W. Rochon, 454 Lafontaine Park, Montreal, has been awarded the contract for electrical work on $34,000 factory being erected on Marie Anne Street by the Atlas Paper Box Company.

Messrs. Hart & Buchanan, 759 St. Antoine Street, Montreal, have been awarded the contract for electrical work on $40,000 alterations to the factory of National Drug & Chemical Co., Montreal.

Messrs. Booth Bros., 316 Melrose Ave., Montreal, have been awarded the contract for electrical work on $12,500 residence, under construction at Harvard & Cote St. Antoine Road, Montreal.

Mr. J. A. St. Amour, 2171 St. Denis Street, Montreal, has been awarded the contract for electrical work on $70,000 warehouse being erected on St. Paul Street West by Messrs. Laporte Martin, Limited.

North Sydney, N. S.

Messrs. Ellis & Co., Commercial Street, North Sydney, have been awarded the contract for electrical work on $25,000 addition to the Canadian Bank of Commerce at North Sydney.

The United States Commerce Reports announce that The Hawkes Bay Power Board proposes to raise a loan of $973,300 for a hydro-electric plant on the Waikaremoana River and to distribute the current to Wairoa and surrounding country. Wairoa is situated in one of the most prosperous and progressive sections of New Zealand.

Orillia, Ont.

The buildings, plant and equipment of the Electro Foundries, Limited, were totally destroyed by fire recently. The plant was electrically operated, smelting being done with an electric furnace of 1,500 kv.a. capacity. The loss was estimated at between $25,000 and $40,000. The plant was insured.

Ottawa, Ont.

The Ottawa City Council have decided to apply to the Provincial Government for power to borrow the necessary money to purchase the Ottawa Electric Railway, provided the ratepayers approve of its purchase by plebiscite in January. The price will be fixed by arbitration.

The number of telephones installed in Ottawa during the past year by the Bell Telephone Company, while somewhat less than the previous year, shows a substantial increase, according to the figures submitted by Mr. J. A. Gorrie, Ottawa district manager. The new telephone directory to be distributed December 15th contains the names of 23,458 stations. This is an increase of 1,785 over the total for the year ending December 15th, 1919. According to the latest compilations there are to-day 12,298 individual resident telephones in Ottawa, and 4,549 business telephone stations. The company also maintains 170 public telephone stations scattered throughout the city.

It is reported that the Ottawa city council has voted [illegible] an amendment of Ald. Ellis by a vote of [illegible] to [illegible] the question of asking federal legislation [illegible] that the agreement between the city and the Ottawa Electric Company be amended to allow the city [illegible] over the railway after securing a price by arbitration.

Outremont, Que.

Mr. E. Hodge, 388 Rachel Street East, Outremont, has been awarded the contract for electrical work on two $20,000 residences being erected on Hartland Avenue by Mr. J. C. [illegible]

Peterboro, Ont.

Seven-cent fares went into effect on the Peterboro Radial Railway on December 1st.

Preston, Ont.

Mr. Urban Meyers of the Electrical Fittings & Foundry, Limited, Preston, was recently presented with a library table from his fellow employees on the occasion of his marriage.

Toronto, Ont.

The Brazilian Traction Light & Power Company, Limited, announce that a quarterly dividend of 1½ per cent. will be paid on the cumulative preference shares of the company, on January 1, 1921, to shareholders of record at the close of business on the 15th day of December, 1920.

The executive staff of the G. N. W. Telegraph Company has now taken possession of its new quarters in the World Building, Richmond Street West, Toronto. The formal installation was the occasion for the presentation of a gold fountain pen to the general manager, Mr. Geo. D. Perry. The presentation was made by Mr. W. G. Barber, general commercial superintendent, who expressed the high personal regard and admiration which he and his associates had for Mr. Perry. The G. N. W. has taken the two top floors of the World Building for the use of the executive staff. The local office, operating staff and commercial news departments will remain in the old building on Wellington Street East.

Messrs. Briggs & Nicol, electrical contractor-dealers, have moved to their new store at 1566 Danforth Avenue, where they have more commodious premises, and will be in better shape to look after their increasing business.

The New York & Ontario Power Company, a United States concern, in which Col. J. Wesley Allison of Morrisburg, and W. B. Connolly, Hamilton, are interested, is said to be preparing to make an application to the Federal Power Commission at Albany, N. Y., for a permit to proceed with its power development at Waddington, N. Y. Report states that the company plans to develop from 20,000 to 30,000 horse power at Waddington.

Mr. B. Balment, 1650 Danforth Ave., Toronto, has been awarded the contract for electrical work on two stores and apartments being erected at Danforth & Jones Avenues, at a cost of $15,000 each.

Mr. E. H. Mills, 22 Emerson Avenue, Toronto, has been awarded the contract for electrical work on two stores and apartments being erected at 1136 Bloor West.

Mr. J. Everard Myers, 4 Gould Street, Toronto, has been awarded the contract for electric light and power installation at the new seven-storey factory being erected at Port Credit for the St. Lawrence Starch Works.

The Salisbury Electric Co., Limited, electrical contractors, formerly at 615 Yonge Street, have moved to 34 Toronto Street.

Mr. E. A. Drury, 154 Oakwood Avenue, Toronto, has been awarded the contract for electrical work on a $10,000 [illegible] being built [illegible] Road.

Messrs. [illegible] & [illegible], [illegible] Ave., Toronto, have been awarded the contract for electrical work on addition and alterations to bank building at Wellesley & Bleecker Streets, Toronto.

Messrs. Bennett & Wright Co., 72 Queen East, Toronto, have been awarded the contract for wiring Withrow Avenue school at a sum of $1,290.

The Canada Electric Co., 175 King East, Toronto, have been awarded the contract for wiring Riverdale Collegiate at a sum of $2,031.

Messrs. W. F. Moon & Co., 2924 Dundas West, Toronto, have been awarded the contract for electrical work on the $50,000 business block being erected by Mr. William Rowntree, 2885 Dundas West.

Mr. M. Nealon, 9 Glen Morris Street, Toronto, has been awarded the contract for electrical work on $200,000 school erected at 174 Beverley Street, Toronto.

The Toronto Electric Co., 101 Duke Street, Toronto, has been awarded the contract for electrical work on $20,000 branch of the Imperial Bank under construction at Queen & Carlaw Ave., Toronto.

Contract will be let for electrical work on $40,000 carburetor plant being built on Kingston Road by the Canadian Tygard Engine Co. Architect, H. R. Watson, 907 Excelsior Life Bldg., Toronto.

The Canadian General Electric Co., Ltd., 212 King West, Toronto, have been awarded the contract for electric machinery to the value of $162,000 for construction work for the New Brunswick Electric Power Commission, St. John, N.B.

The Salisbury Electric Co., Toronto Street, Toronto, have been awarded the contract for electrical work on a $60,000 factory being erected at King & Sackville Streets by the Decalcomania Co. of Canada, Ltd.

The figures for the Toronto Civic Railway for the month of November are as follows:

	Nov. 1920	Nov. 1919
Passengers carried	2,939,357	2,414,301
Passenger revenue	$48,984	$40,919

Vancouver, B.C.

For a sum said to be between $7,000,000 and $8,000,000, represented in debenture guarantees, the British Columbia Electric Railway Company is acquiring control of the Western Power Company. On December 23rd the Western Power directorate will resign to be replaced by the administrative officers of the British Columbia Electric Railway Company, headed by George Kidd, general manager.

Messrs. A. Buck & Co., 2616 Main Street, Vancouver, have been awarded the contract for electrical work on $13,000 residence and garage at 33rd Ave. and Connaught Drive, Vancouver.

Victoria, B. C.

The Whittall Electric Co., 1112½ Broad St., Victoria, have been awarded the contract for electrical work on $15,000 alterations to Mr. J. W. Spencer's residence, "Craigdarroch," Victoria.

Contract will be let for electrical work on $40,000 club house to be built at Oak Bay by the Victoria Golf Club, Oak Bay, Victoria. Architects, Wood & Richards, B. C. Permanent Loan Building, Victoria.

Color Lighting in Show Windows

The National X-Ray Reflector Company has issued a folder describing their Color-Ray, a practical device for producing colored lighting in show windows. This company have also just distributed some interesting literature covering showcase lighting, office lighting and X Ray direct lighting reflectors for mills and factories.

TK
1
E44
v.29

Electrical news and
engineering

~~Physical &~~
~~Applied Sci.~~
~~Serials~~

Engineering

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY

ENGIN STORAGE